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THE GEOGRAPHICAL JOURNAL

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The attention of Fellows is called to the Memorandum on Project for Hall and Library which was sent out at the end of October, with its Appeal for subscriptions to the Building Fund. Small provisional sketch-plans of the proposed buildings were included. Since October the Architects have been in constant consultation with the Officers and Council, who hope that definitive Plans, Sections, and Elevations may be ready for exhibition in the Society's House early in December. Subscriptions and promises to the new Building Fund amounted on November 22 to £8604, and the Council hope that they may receive by the end of the year such substantial portion of the £10,000 still required as will warrant their proceeding at once with the complete scheme.

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EVENING MEETINGS IN THE AEOLIAN HALL

Monday December 3 at 8.30 p.m.
THE SOUTH-EAST BORDERLAND OF THE RUB' AL KHALI. *By Captain B. S. Thomas*

Monday December 17 at 8.30 p.m.
CAPTAIN JAMES COOK. *By Sir Henry Newbolt*
CAPTAIN COOK AND THE ESTABLISHMENT OF THE BRITISH IN THE PACIFIC. *By Professor J. Holland Rose*
CAPTAIN COOK AS A HYDROGRAPHIC SURVEYOR. *By Rear-Admiral H. P. Douglas*

Monday January 7 at 8.30 p.m.
THE FIRST CROSSING FROM THE FLY RIVER TO THE SEPIK, NEW GUINEA. *By Mr. C. H. Karius (read in his absence by Mr. A. F. R. Wollaston)*

Monday January 21 at 8.30 p.m.
THE NORTHERN NEW HEBRIDES. *By Mr. J. R. Baker*

AFTERNOON MEETINGS IN THE MAP-ROOM, R.G.S.

Monday December 10 at 5 p.m.
NEW MAP PROJECTIONS. *By Mr. S. W. Boggs, Mr. A. R. Hinks, and others*

Monday January 14 at 5 p.m.
THE CAMBRIDGE PENDULUMS FOR GRAVITY SURVEY. *By Col. Sir Gerald Lenox-Conyngham*

CHRISTMAS LECTURES TO YOUNG PEOPLE IN THE AEOLIAN HALL

Monday December 31 at 3.30 p.m.
THROUGH FRENCH INDO-CHINA. *By Madame Gabrielle M. Vassal*

Friday January 4 at 3.30 p.m.
CAPTAIN COOK'S QUEST OF THE SOUTHERN CONTINENT. *By Dr. Hugh Robert Mill*

Applications for tickets should be made to the Chief Clerk by the morning of December 27

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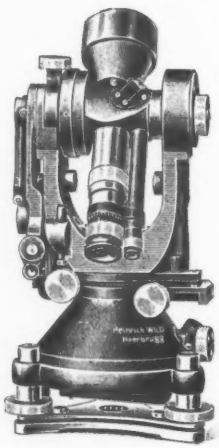

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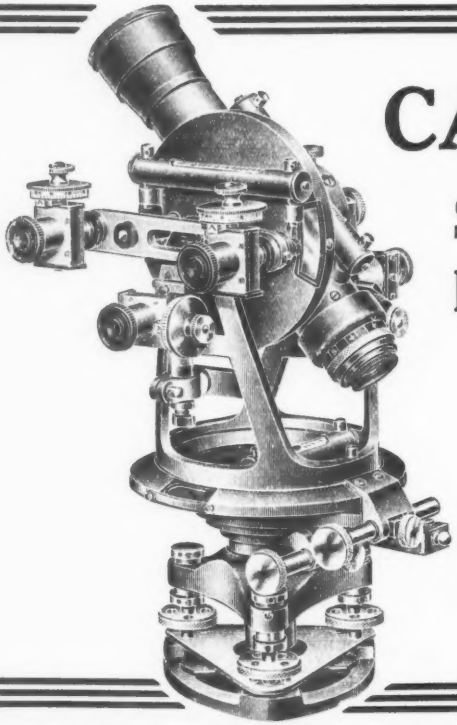

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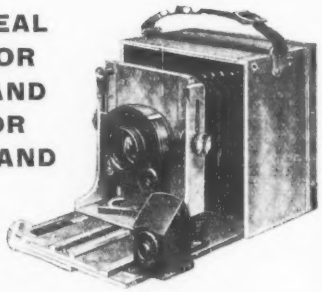

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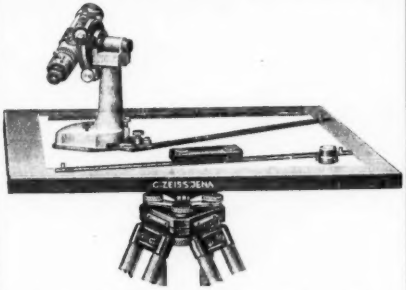

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The
GEOGRAPHICAL JOURNAL

Vol LXXII No 6 R.G.S. *December 1928*

CARAVAN ROUTES OF INNER ASIA: *The third "Asia Lecture," read at the Evening Meeting of the Society on 5 November 1928 by*

OWEN LATTIMORE

ALTHOUGH my subject concerns the geography of Mongolia and Chinese Turkistan I shall deal with it as it appears to a man who is not a scientific geographer. In 1926 and 1927 I travelled overland from Peking to India. The journey took me through Mongolia by camel caravan for a distance of some 1600 miles, along a route which, as a whole, has never been explored. Later, in Chinese Turkistan, I was joined by my wife, who made a very enterprising journey by rail and sleigh through Siberia to meet me, and together we finally reached Kashmir. The subject in which I was chiefly interested throughout the journey was the courses and movement of trade. I wanted also to get, on the ground itself, material for a comparative study of the trade routes of the present day, in relation to what we know of ancient routes in Inner Asia. I had then been in China for seven years, during which I had gained some knowledge of the workings of inland trade and, which was even more valuable, a thorough knowledge of vernacular Chinese.

I will spend most of my time on Mongolia, because the way I travelled there and the things I saw were more unusual than anything that can be told about the comparatively well-known routes of Chinese Turkistan. Also, since I am no learned geographer, I may be allowed to drag in topics which, though not strictly geographical, are allied to geography—the life of primitive people, the courses of tribal migration, and the origins and movements of trade.

The two "Asia Lectures" already delivered have been by two of the leaders of Central Asian discovery. Sir Aurel Stein has given us the benefit of his extraordinary learning and the massive industry which has enabled him to light up more than any other man the dark places of Central Asian geography and history. Mr. Roy Chapman Andrews has shown what can be done by taking a large corps of men, all of them experts in widely different fields, and transporting them about Mongolia in motor-cars, covering an enormous amount of ground in reconnaissance, as well as working intensively at chosen sites.

In comparison, my own work is inconsiderable. I know that I am out of date, like a survivor from earlier generations, when the traveller was perhaps more of a wanderer than an explorer. But something remains, for all that,

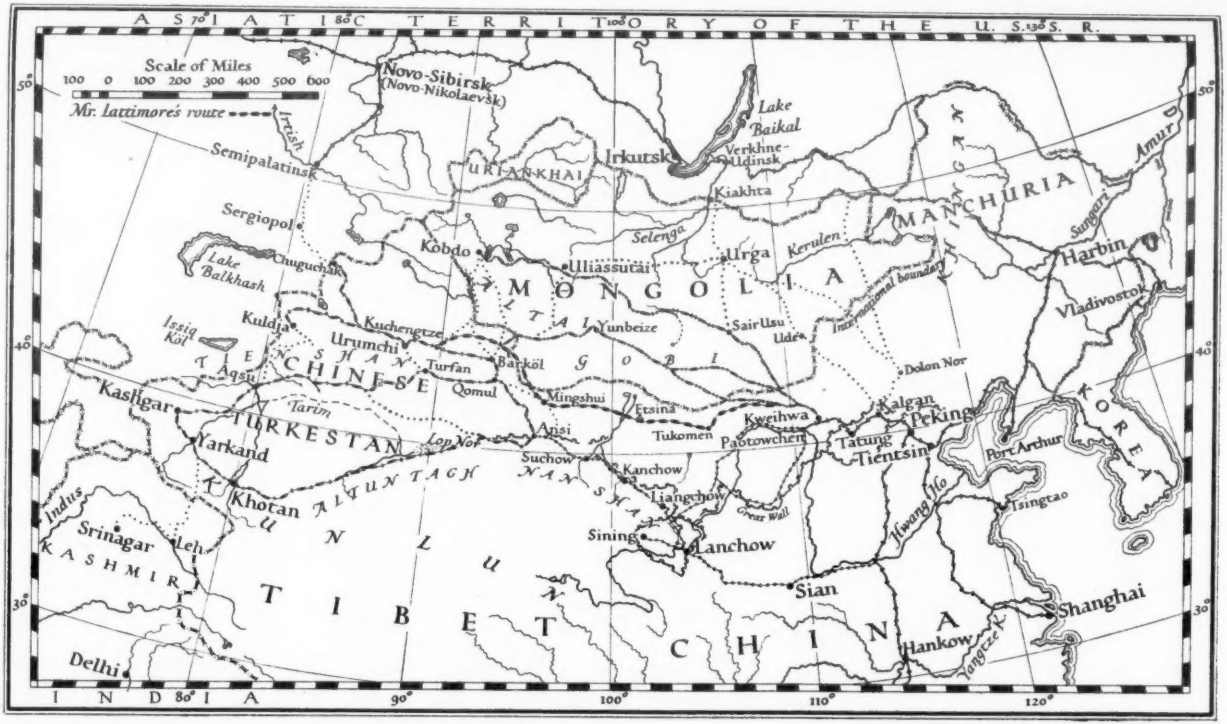
which can be studied best by the man who travels, so to speak, close to the ground. If you are accompanied by a number of assistants, it is difficult to remain in close, sympathetic touch with the people of the country. The mere fact that you are constantly talking in an unknown language excites curiosity and suspicion. If you do a lot of digging and surveying, if you deal much in mechanical devices—let alone such roaring monsters as motor-cars—these difficulties become almost insurmountable. You must remember that in those countries you must be prepared to deal with people who think that field-glasses are filled with human eyes. They think that only the strength of a large number of eyes put into that instrument could make it see so far. They also think that a foreigner, with his glasses, can look into the ground and discover gold and jewels.

If there is any value in the work I was able to do, it is chiefly because what I learned was learned while travelling the ancient routes of Inner Asia with caravans practically the same as those which tramped the same routes hundreds, in fact thousands, of years ago. The conditions were the same. The dangers of thirst, cold, sand-storm, snow-blizzard and attack by robbers were the same. The caravan men and traders were not different in any important respect. Everything that I saw, felt and heard would have been seen, felt and heard, with little exception, by a stranger travelling two hundred or two thousand years ago. I had not even any maps that were of any use in illustrating the daily march.* The problems of direction and distance over which I puzzled every day would have appeared in the same light to Marco Polo, say, or William of Rubruck. I had only one advantage over them—in knowing the language of the people with whom I lived. There was no need to attempt anything so elaborate as travelling in disguise, but I did pass familiarly among these people. Not only my language, but all my routine, my food, and a large part of my clothing were the same as theirs.

Perhaps the best way to approach our subject of the caravan routes of Inner Asia is to describe first some of the daily experiences of caravan life, the men to be met and the difficulties to be encountered. In that way we can see the routes as nearly as possible from the point of view of the men who earn their living tramping up and down these obscure highways of the desert. Then, after the stage has been set, and we have seen something of the characters, we can go on to discuss the origin and development of these caravan routes which are, after all, nothing less than a magnificent historical spectacle, set in and dominated by geographical conditions of a peculiar fascination.

Of the two great routes from China into Central Asia, the only practicable land routes in ancient times between China and the West, one goes up from Central China to the edge of the desert and then crosses into Chinese Turkistan without touching Mongolia at all; the other goes from North China through the central, northern and western territories of Mongolia. As it goes west it offers a choice of directions. One lies through Uliassutai and Kobdo, with approaches to Siberia at Chuguchak or Altaiski. One goes to Kuchengtze, entering Dzungaria, or northern Chinese Turkistan. This latter version of the route is known as the Great Mongolian Road. From Kuchengtze, access

*Sketching would have aroused the most awkward suspicions; and both my compasses went out of order.



The principal caravan routes of Inner Asia

can be had to the inner basin of Chinese Turkistan, or trade and the traveller can continue to the north of the Tien Shan, entering Siberia either at Chuguchak or Kuldja.

When I came to set out on my travels I could not follow the first route because of civil wars, banditry and anti-foreign feeling. I could not take the second because of late years the tribes of Outer Mongolia, largely under Russian influence, have declared their independence of China and will not allow caravans or travellers from China to enter their country. These abnormal conditions throughout the hinterland made travelling more dangerous than it has been for many years. On the other hand, they had an unexpected and fortunate result, in making it possible for me to hit off an east-to-west route through Mongolia that is, taken as a whole, entirely new on our maps. Moreover it has, I think, a good deal of significance in the comparative study of ancient and modern caravan routes. It traverses country so desert that, except for this lucky pressure of circumstances, guides would have been hard to find, caravan men would have denied the existence of a practicable route, and the cost of establishing it would have been prohibitive.

This route has been worked out by the caravans trading between North China and Chinese Turkistan. It has come into use because it is less open to interference from either Outer Mongolia or the border country between Mongolia and China; but even so it is vulnerable to raids at several points from either north or south, and caravans travel in almost constant danger either of attack by robbers or extortion by soldiery. The eastern half of the route is determined by series of wells which, in my opinion, prove it to have been in all probability much used in ancient times, but neglected for centuries owing to changes in the relations between the Chinese and the peoples of the Mongolian plateau. The western half offers a traverse through the least-known country in all Mongolia, a no-man's-land of remarkable interest which, from its physical characteristics, has probably been a debateable ground throughout history.

Leaving Peking by the railway which skirts a part of the Mongolian border country, I started by camel caravan from Kweihwa, which is known to the Mongols, and is described in several books of travel, as Kuku-khoto. The start was not accomplished until I had been delayed at Kweihwa for nearly six months, by a series of difficulties which I need not describe here. I had a caravan of nine camels—several more than were necessary—which I had secured by complicated negotiations after the first camels I hired had been seized for use in a Chinese civil war. The camels were in charge of one man, their owner. The only other man in the party was "Moses," my Chinese servant.

Moses was a stout-hearted Chinese of the fine northern stock. He had been in my service a number of years, and had served my father before me. He not only volunteered to go into Mongolia, but insisted on going. His fidelity can only be appreciated by a foreigner who knows what the interior of China was like at that time, with sporadic outbreaks of anti-foreign feeling, in addition to the banditry rampant in many places. It was a time when it would have been hard to bribe a trustworthy man to accompany a foreigner on a long journey through unknown country. Moses put the matter plainly, as one of

Watering camels at Shih-pau Chiang (Stone-slab wells), after 100-mile crossing of Khara Gobi

Camp near Tuhulu in northern valley of main range of Qarliq Tagh

Camp at Morhgujing, where Winding Road diverges from Small Road

City of Maralbashi, Chinese Turkistan

Pagoda, Shansi Guild (chief caravan traders' guild), Kuchengtze

his final arguments, when I was hesitating about taking him. He said that it was absolutely necessary for me to have a safe man behind my back. He was quite right. Had it not been for his Ulysses-like qualities of courage tempered by wily counsel, I might half a dozen times have fallen into worse trouble than I did.

As the route we followed has so recently come into regular use, it is unknown to numbers of men who have been bred up in the caravan trade. My camel man did not know the way, and thus for a great part of the time we travelled by attaching ourselves to trading caravans. In this way I came to live among the caravan men exactly like one of them. We travelled mostly at night. Had we travelled by day and turned the camels loose at night to graze, there would have been a danger of their straying and getting lost; whereas by grazing them during the day we were able to keep an eye on them.

We began the day at dawn, by making tea. We had with us only brick-tea, made of the coarsest grades of leaves, twigs and tea-sweepings from the warehouses compressed into solid blocks, from which we would chop off as much as we needed for each brew. In this tea we used to mix either roasted oaten flour or roasted millet—looking like canary seed, which in fact it was—stirring it into a thin slush and drinking it down. About noon we had the one real feed of the day. This would be made of half-cooked dough. We carried the white flour along with us, and would make the same sort of dough every day. We would moisten the flour, roll it and thump it, and then either tear it up in little blobs or cut it into a rough kind of spaghetti.

The reason we drank so much tea was because of the bad water. Water alone, unboiled, is never drunk. There is a superstition that it causes blisters on the feet. Our water everywhere was from wells, all of them more or less heavily tainted with salt, soda and I suppose a number of mineral salts. At times it was almost too salt to drink, at other times very bitter. The worst water was in tamarisk regions. The tamarisk is a desert tree, or rather shrub, sending down its roots to a great depth to reach water. When the water is near the surface the roots, rotting in the moist earth, turn the water a yellow colour. It is thick, almost sticky, and incredibly bitter and nasty.

Sometimes we had water every day; usually we came to a well every two or three days, carrying a supply with us in flat-sided, wooden butts, which could be loaded two on a camel. Our longest distance between wells was in the crossing of the Black Gobi, where we had one stretch of nearly 100 miles between wells. Our average march was 15 or 16 miles, but in forced desert crossings we could push the distance up to 30 miles.

The men of the caravans belong as unmistakeably to their calling as seamen belong to the sea. Perhaps 10 per cent. of them are Mongols. The rest are Chinese of different northern and western stocks, from Shansi and Kansu and the communities of Chinese settled in Turkistan. Almost all of these Chinese have strains, more or less remote, of Central Asian blood—whether Mongol or pre-Mongol, Turkish or Tangut, or some other of the migrating peoples that in the course of centuries have alternately invaded or been thrown back from the border country. Whatever their origin may be, they are first and last men of a calling. They belong to the Gobi routes. When they set out on a journey they put behind them every association binding them to cities and

tilled fields. They even hold lightly associations which have almost a sacred force among the Chinese, such as their responsibilities as householders or heads of families.

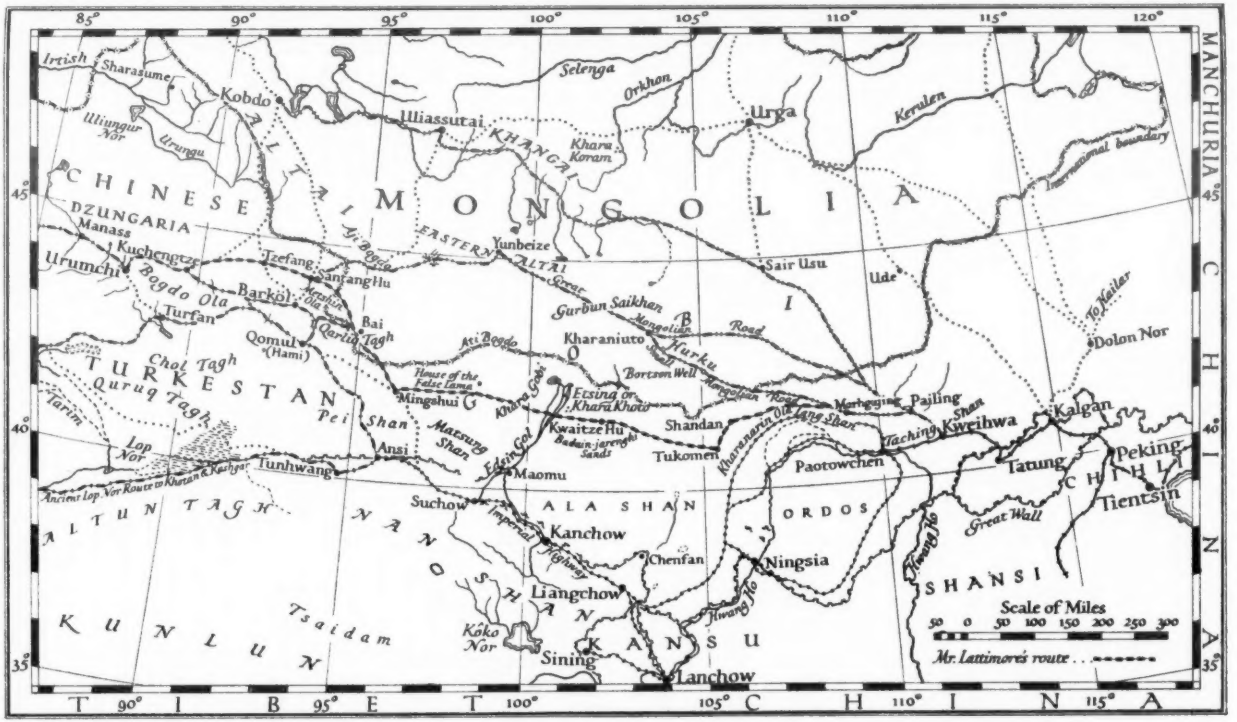
It is perhaps too definite to say that they leave behind their gods and the creed of their ancestors, because at best their gods and creeds are vague and unformulated. Yet the departure has all the effect of such a renunciation. They discard one set of customs, observances and tabus, and submit themselves to another. *Tso hou-ti, sui hou li*, they say: "Travelling in the Back Country (the Mongolian plateau, that is), follow the observances of the Back Country." They feel that in the desert human actions are subject to the attention of a different array of powers. In fact, they become nomads. Many of their propitiatory rites and self-defensive tabus are not only taken over from the Mongols, but are inheritances, among the Mongols, from the most primitive instincts of nomadic people. They strive to propitiate the powers and spirits that follow at the heels and lurk about the tents of savage, wandering people at grips day and night with the harsh menace and niggardly resources of a raw, unmastered country.

From the moment that the tent is pitched at the first camp, the "Custom of the Caravan" prevails.* Fire and water assume a different importance. Each time that the tent has been set up in a new place, a little of the first water boiled and the first food cooked must be thrown on the fire, and a little out at the door. The offering to the fire is evidently to honour it for its services, and the offering thrown out at the door is to honour the *genius loci*, lest it be dismayed or angered at the intrusion of men. The caravan men themselves naturally, have no such explicit theory of their behaviour. They say simply that they are observing the *li*, the custom or ritual.

Other observances are in the nature of tabus. A caravan man may not slaughter a camel, nor eat camel flesh, nor sell the hide of a camel. If a camel becomes too weak to follow the caravan, it is left by the trail to die. The owner will not kill it, for fear that its soul might follow the caravan, haunting the other camels. The tabus on camels apply especially to the caravan men. Other tabus are part of the Mongol life reflected in the caravan life. In eating mutton, a caravan man is almost as scrupulous as a Mongol in stripping the bones of every particle of flesh, gristle and sinew. The Mongols regard sheep as their staple of life. A sheep may be deprived of life only to prolong the life of man. It is not only the flesh of the sheep, but the vigour of its life that enters into the body of man. Therefore to waste any of the flesh would be to treat the loss of its life as a matter of no account, and for this the disturbed soul of the sheep might well haunt either the taker of its life, or his flocks. The soul of the sheep is only honoured if its flesh is eaten scrupulously without waste.

The souls of animals and men, in other words, are distinct from their lives. The life of the sheep enters into the man: the soul survives. To make doubly sure that the soul of a sheep will not work mischief, it is both honoured and injured. Certain of the major bones, preferably the shoulder blades, ought to

* Except among Muhammadan caravan men, who think themselves above all these propitiations. Islam is like Christianity; in going abroad it asserts itself against all the gods it finds in the way.



Caravan routes from China to Central Asia, showing Mr. Lattimore's route from Kweihwa to Kuchengtze

be broken. As long as the bones are uninjured, the soul has a vehicle which it may use in haunting the man that slaughtered it; but if the bones are broken the soul is lamed and powerless.

I hope that with this talk of ungeographical things, ghosts and superstitions and the practices of more than half barbaric men, I have been able to raise up something like a real background of living men and living traditions for the more technical discussion of these caravan routes of Inner Asia. It is important to remember that along these routes are preserved, in our time, the traditions of the past. We are dealing with trade routes in modern use, but they are routes that can be used to advantage only by a special class of trader, and this class must have been essentially the same in the past as it is now. The men who take caravans out and back through Mongolia are migrants. They are a mixed race, without true nationality, one might say, forming a link between the nomadic and the settled races. They are not business men, able to calculate in advance their yearly turnover, maintenance charges, and percentages of profit. Like the nomads, their wealth is tied up largely in living animals, whose capital value is subject to great variation. They take up a cargo on the edge of China, migrate with it for hundreds of miles into Mongolia, or across Mongolia to Chinese Turkistan. There they pick up the most advantageous freight they can find and make a return migration toward China.

There may be a fortune in the business. There may be only privation and suffering. There may even be robbery or captivity, or death by storm or violence. The men travel between known destinations, it is true, but they must be prepared on the way to open new passes across mountains, or undertake new detours through deserts. They represent an adaptation of nomadic society to the uses of civilized trade. They are, in fact, commercialized nomads, and it is this perpetuation of the nomadic tradition that I wish to bring out in discussing the geographic distribution of caravan routes. It is not only a clue to the right appreciation of routes in Central Asia, but it distinguishes the two main classes of trade routes. One class comprises the routes which lie in channels created by migration, by the movement of whole peoples. The other includes the routes of what we may call a normal kind; routes, that is, for which the normal use, throughout history, has been the transportation of goods from point to point for commercial advantage, routes by which individuals or parties of men have always travelled as we travel now, for political, personal, commercial or even religious reasons.

A rapid survey of my own route will show some of the geographical factors which have been important in the past, and many of which have an undiminished importance in the present. A reference in brief to the map will show the most important correspondences between this route and areas traversed by other travellers. Up to Morhgujing it corresponds roughly to the Younghusband route of 1887. At Shandan Miao and Tukomen (Bain-tuhum) it crosses different routes of Prjevalski. In the region of Kuai-tze Hu important work has been done by Kozlov. The Edsin Gol has been visited by Kozlov, Stein, and Warner. West of the Edsin Gol the only known route appears to be that of Ladighin (one of Kozlov's assistants) from north to south. At Ming Shui the route probably touches again that of Younghusband; at any rate

from then on it approaches country worked in by Obruchev, Holderer and Futterer, and their successors.

Kweihwa stands in a wide depression. On the south are the hills that in time past were the frontiers of Shansi province. On the north are the hills rising to the Mongolian plateau. The region is by nature a debateable ground, and has been disputed between the Chinese and different Tatar races. A legend survives of the ruse by which a Chinese general established the tradition that the northern rather than the southern range should be the perpetual boundary between Mongols and Chinese. The resources of the country about Kweihwa, especially in grain and other supplies, make it a natural centre of Mongol trade and a nodal point of caravan traffic.

The range to the north, called by the Chinese the Taching Shan, looks from Kweihwa to be a true mountain chain, but on ascending through it a plateau is found on the northern side, instead of a descent, and it is seen to be an escarpment of the Mongolian plateau. On the southern face of the Taching Shan a few patches of coniferous forest survive, by virtue of being temple sanctuary. Larger forests must have survived until comparatively modern times, as the deforestation is attributed by local legend to the building of the Mongol temple-community which is the core of Kweihwa town. The minor hills which break the surface of the plateau on the north can hardly have been forested in historical times, but air currents from the Pacific, caught by the Taching Shan, extend their influence well into the plateau, ensuring a precipitation of rain and snow enough not only to nourish excellent pasture, but to make possible the cultivation of the hardier cereals, such as oats. This frontal part of the plateau is being rapidly penetrated by Chinese colonists, but vast reserves of pasture are left. These ideal grazing grounds for the annual "conditioning" of camels during the period when they shed their hair, in proximity to cheap food-supplies for men, explain the natural importance of Kweihwa as a caravan centre.

The transition from the pasture country to desert conditions is marked in a general way both by a gradual rise in altitude and by the diminishing effect of the Pacific moisture. The main Gobi trends roughly from south-west to north-east. In the extreme west it abuts on the Quruq Tagh, on the far side of which is the Taklamakan desert. It is apparently at its widest, from north to south, from long. 100° to 105° E., diminishing gradually toward the east and at last "running out" in Eastern Inner Mongolia as it approaches the Khingan Mountains. On the northerly side of the main Gobi it would appear that moisture is again condensed by such important ranges as the eastern Altai and the Khangai. In the belt of country under the climatic influence of the eastern Altai, good pasture is found, supported by springs and subsoil drainage, where wells can be dug to tap underground watercourses at no great depth. Still farther north the Khangai Mountains determine a region of great plenty, with forests, arable country as well as pasture, and lakes and rivers draining toward, or flowing into, Siberia.

Directly north of Kweihwa the Gobi is nothing like so formidable as it is farther to the west. Caravan routes toward the west and north-west therefore make very little westing until the arid country has been crossed, and lines of water and grazing can again be picked up. These lines lie parallel with the

governing orographical features of the country, which are formed of chains of hills with a general south-east to north-west tendency—departing at a widening angle, that is, from the axis of the Gobi, as they go west. As these hills decline into plains the subsoil drainage which they conserve approaches the surface, grazing is found, and wells can be dug even if no springs break forth.

The caravan men distinguish the various alternative routes according as they take the northerly or southerly side of the hills. All of these routes, however, have at present the political disadvantage of entering Outer Mongolia; for the Gobi itself distinguishes Inner Mongolia (the sphere of Chinese activity) from Outer Mongolia (the sphere of Russian activity). Thus the political boundary is not a handy and absolute demarcation but (except in the extreme east, where Inner and Outer Mongolia blend into Manchuria, and an according political confusion prevails) an arid waste of variable width.

The route which I followed goes only far enough north to find a practicable line to the west, without trespassing on the northerly side of the Gobi, where the wells are watched by patrols of the independent Mongols. Then it strikes right away west, holding almost straight on through what appears, by a comparison of available accounts and on the testimony of the caravan men themselves, to be by long odds the most extensive and the most arid desert country in all Mongolia; the heart of the main Gobi. This is the route that always ranked in my own thoughts as distinctly the "desert road" to Turkistan.

The broad structure of the main Gobi is so simple, and so lacking in salient local details, that it is hard for an uninstructed traveller like myself to apprehend minor details of formation, though they may be of great importance. I had to acquire the "feel" of the desert gradually, while travelling for hundreds of miles, and storing my mind with hints from the talk of veteran caravan men; for these men themselves, though they have an admirable geographical sense, go almost entirely by the feel of the country. They can hit off an excellent line of march, conforming to the general features of the country, but they cannot analyse, they cannot give you a rational explanation of the particular topography of a piece of country immediately under their noses.

Fortunately, my general impression of physical characteristics along the route I followed is borne out by the particular observations of such explorers as Prjevalski and Kozlov. These have established that there is a series of depressions in an east-to-west line, roughly following the long axis of the Gobi and about in the middle of its expanse from north to south. The Gobi itself is a plateau, tilted toward the south, but this series of depressions forms a shallow trough down the middle of it. Toward this trough there seeps a scanty subsoil drainage. It is as if the Gobi had a sunken spinal channel, instead of a raised spinal ridge of mountains, and the caravan route simply feels its way along the line of depressions, keeping as far as possible to the lowest country.

The Winding Road or Desert Road does not immediately strike into this line of depressions. For a travelling distance of about 240 miles it accompanies what the caravan men call the Small Road, a southern branch of the Great Road or chief route to the West, which it later joins. This first stage lies through the pasture country under the climatic influence of the Taching Shan and its westerly extensions. Then for some 40 miles an increasing aridity

is apparent. This may be because the mountains on the south, forming the rim of the plateau, are not so high as the Taching Shan.

After entering the arid country the Small Road diverges to the north-west, at a point called Morhgujing, while the Winding Road holds on more to the west. The Small Road, as I understand it, coincides with the route followed by Younghusband in 1887. It goes far enough north to reach the southerly flanks of the Hurku hills, and continues along them until a line of wells is picked up tapping the drainage to the south from the eastern Altai. The Winding Road, after the divergence, crosses a range called by the caravan men the Laohu Shan or Tiger Mountains. These hills, I infer, decline on the north to a gap, on the far side of which rise the Hurku, which in turn come more or less into touch with the Gurbun Saikhan, the most easterly spurs of the Altai.

West of the Laohu Shan the Winding Road, after crossing a shallow depression of desert country, skirts on their northern edge the foothills of the Khara-narin-ula of Prjevalski, which are a western projection of the Lang Shan. Then it descends again to low country at the temple of Shandan (marked by Prjevalski) at which point there is a cross-route toward the north, and takes a long southerly cast to avoid very sandy country and large dunes. The sandy country evidently fills one of the hollows in the east-to-west series through the central Gobi.

The detour finishes at the temple of Tukomen (evidently the Bain-tukhum of Prjevalski) and the westerly direction is resumed. There is an important salt marsh near Tukomen. Dunes encroach on the meres in places, and I assume that the whole basin was formerly a lake. That the recent tendency is toward increased aridity rather than a recovery of the lake is indicated by a line of fine old elms following an underground watercourse that flows toward the marsh. All the trees are old and big, evidently with roots that go deep enough to nourish them though the supply of moisture has decreased; but there is not a sign of new growth.

Minor depressions are evident to the west of Tukomen, until Kwaitze Hu, the biggest of them all, is entered. I am not sure that the depression at Shandan is in the main line of these depressions, but I think so, and I am sure that from Tukomen on, the route follows what may be called the spinal trough of the Gobi. Evidently there is a tendency for the successive depressions to be deeper toward the west and shallower toward the east.

The landscape is desolate, with a certain monotony, owing to the lack of strongly defined hill ranges, but the sense of vast space is exhilarating. The soil generally is a sandy clay, from which is derived by wind erosion the sand found in the dune area. I remember passing only one place where clay terraces had been cut up by wind erosion into "witnesses," or truncated, flat-topped pinnacles. In these pinnacles, as in the banks of clay cut vertically by vanished streams, the clay lay in horizontal strata. Many old stream-beds could be seen; but they were on the whole almost easier to detect from a distance than when one was close upon them, for ages of weathering and wind-action had gone far toward obliterating local features.

Small, irregular lines of hills, usually with an east-to-west direction, lay along our line of march for much of the way; but at other times the topography

would be confused by immense basins, bordered by low, steep-faced bluffs, or by the vague courses of dry "washouts." Occasionally, when there was no dust haze, we could see as we got farther west distant blue ranges of higher hills lying on our south. I got the general impression that the country is, if anything, getting dryer. I have mentioned the old elms, unaccompanied by new growth. Farther to the west we entered the first large area of tamarisk growth; the region is called the Black Tamarisks, for all the growth is dead. It is found on comparatively hard, flat clay, and there is little evidence of "tamarisk cones."

In the country through which we travelled Mongols were rare, and their life obviously affected by the desert conditions, for sheep were largely replaced by goats and ponies by donkeys. The population was thicker near the edges of the sandier districts, which permit the growth of coarse tufted grass. Along most of our march grew nothing but low, gnarled, sapless, woody plants.

The people are a division of the Olöt (Eleuths), commonly called the Ala Shan Mongols. Their centre of population and trade is based on the Ala Shan, which lay to the south of our route, where far better conditions are found.

From what I have said, it can be seen that this country is as desolate and inhospitable as any in Mongolia. Sir Francis Younghusband has described some of the lonely stretches of wilderness through which he passed on his journey, which followed in great part the Small Road. I can assure him that, on the testimony of the caravan men, that road is by comparison full of joy and amenity. They remember with grief the days in which they were free to travel by it, and revile what they call the "bitterness" of the Winding Road. They had, however, one thing good to say about the Winding Road, which brings out an important physical contrast between it and the other routes. On the Winding Road, because it follows a linked series of depressions, the water is always found close to the trail. Owing to the scantiness of the water, and the fact that it drains at a shallow depth from hills of inconsiderable height, it is full of the salts which impregnate the superficial clays. It is never very palatable, and often vile, but at least it is easier to find, a matter of some importance, seeing that the end of the march always comes in the night, and the position of the well must be determined in the dark. On the greater roads, the wells often lie as much as a mile off the track; for the tendency is to take the line of march along lower levels, both to get better going and because what drainage there is comes to the surface at the foot of the slope from the mountains, and the best grazing is to be found there; while the wells, in order to make sure of an adequate supply of water, must tap the drainage higher up, nearer its sources in the ranges which guide the alignment of the routes.

At a travelling distance of over 200 miles from Shandan Miao, where we had entered the Ala Shan deserts, we reached the most easterly of the depressions, which is at once the largest and the most remarkable. It is called by Kozlov "Goitso," I believe from a Mongol word meaning "pleasant," but the caravan men call it Kwaitze Hu. I travelled some 75 miles along the edge of it, and found it a series of reedy marshes, apparently deepest at the southern edge, which I skirted. To the north stretched great expanses of reeds, while the south and west were closed in by dunes. These dunes range in height—I take Kozlov's figures rather than my own judgement—from 10 to 30 metres,

Caravan in valley descending to open desert, north of Metshin-ola

Above the gorge of Kök-su, Tien Shan

On the Sasser Pass

Devil dance at lamasery of Chao Ho, north of Kweihwa

with a short northerly and a long southerly pitch. They themselves mark the northern edge of a region that he calls the Badain-jarenghi sands, in which he notes a lake called Kuku-burdon, in the position occupied on an old Chinese map by an "enormous lake" called Yü Hai.

The sands themselves were pivoted, so far as I could see, on a core of irregular hills. If the Chinese had, at some date in the past, knowledge of a large lake, or even a great marsh somewhere in this region, then we have good evidence of a change of climate toward more arid conditions within historical times. The depression of Kwaitze Hu itself could obviously be converted by a slight rise in the water-level to a great shallow lake. Springs break out everywhere, and along my line of march were several big pools; but it was impossible to judge the real amount of surface-water, because of the huge reed-beds.

We entered a great belt of dunes at the point where the sands curve round the western edge of the depression, and traversed large dunes for a marching distance of over 30 miles, and sandy country for another 14 miles, as the dunes dwindled away. The dunes were held down in parts by belts of strong tamarisk growth; the largest tamarisks that I ever saw, without a sign of being killed off by the sands. In other parts the dunes were quite clear of all growth, and were probably shifting formations under the influence of wind action. Everywhere they were based on hard clay, which in places was exposed; and wherever the clay was exposed, small beds of dry reeds could be seen. The caravan men said that in such places water could be found at a depth of not more than 3 or 4 feet. This dune region, and that which we had skirted in turning to the south from Shandan to Tukomen, were the only large expanses of loose sand encountered on the journey.

Immediately west of these dunes the east-to-west series of depressions is cut across by a much more obvious trough from south to north, the valley of the Edsin Gol. This valley itself is really very shallow, and in its northern course it fans out. The water which flows in it is carried to two connecting lakes, but a number of dry channels which must once have been flood-beds diverge toward the north-east. The Edsin Gol itself flows here in two channels, about 20 miles apart. It derives from the snows of the distant Nan Shan, in Kansu province, and in a distance of hundreds of miles from east to west its valley forms the only corridor practicable for large bodies of men or transport from north to south across the Gobi, from Outer Mongolia toward China. It is known that this corridor was used by Jenghis Khan in his invasions of Kansu (then ruled not by the Chinese but by the Tanguts) in 1227.

This corridor was marked by the walled city of Etsina, which was occupied at least until the time of Marco Polo, at the end of the thirteenth century, though it has been completely uninhabited now for centuries. The site of Etsina or Khara-khoto is, to my mind, very significant for the reconstruction of early trade routes. I must have passed within a few miles of it, though unfortunately I did not see it; but we know from the descriptions of General Kozlov, Sir Aurel Stein, and Mr. Langdon Warner that it as a city of some size and prosperity, far more than a mere garrisoned stronghold. The existence of such a city at such a site presupposes an important trade. It may well be that the snows in time past lay deeper on the Nan Shan, and that at their

seasonal melting the volume of water carried by the Edsin Gol toward the desert may have been greater. Even so, and even if it had been possible to divert water from the river for irrigation, the nature of the country shows clearly that the city can never have been the centre of a large or flourishing agricultural district, or even an administrative centre for numerous nomadic tribes.

I think that the importance of Etsina must have been based on its convenience as a point from which trade radiated both to the north, into Outer Mongolia, and toward the east, to the Kweihwa region. A slightly greater amount of moisture in the past may not have meant more favourable conditions for habitation in the Gobi, but it may well have meant a much more practicable caravan route down the trough-line that I have indicated through northern Ala Shan. At the time that Etsina was flourishing as an outpost of the Tangut power, Kweihwa was the capital of another minor kingdom, that which Marco Polo calls Tenduc. It is obvious that at a time when such minor kingdoms existed, trade between them would be much more likely to use a caravan route sheltered by deserts than one farther south, through inhabited country, where other local chieftains probably existed who would have been prone to levy all kinds of caravan tolls.

At present, the route which I have been describing with a good deal of detail is not physically suited to caravan traffic; not nearly so well suited as the routes farther north. If even two large caravans are travelling in company, they have often to space out the watering of their camels at alternate wells, as many of the wells would not suffice for, say, three hundred camels in one day. In addition to this, the grazing is not sufficient for caravan camels. Even in such unfavourable country, nomadic existence is possible if people live widely scattered, and rely on such frugal animals as camels, goats, and donkeys, rather than horned cattle, sheep, and ponies, because their baggage animals are worked only spasmodically. For a caravan camel, however, travelling day after day with a heavy load, feed must be carried. On an average, 30 per cent. of caravan camels on this route are laden with feed. As this is used, loads are divided and redistributed, so that at the end of the journey the average load is much decreased. In addition to feed carried, however, feed must be bought on the way, especially in a hard, cold season. This feed is supplied by traders who come up from the borders of China and camp along the middle section of the route, in the Ala Shan deserts. The cost of caravan travel is therefore greatly increased, while its earning capacity is decreased by the number of camels used for carrying feed. In spite of the extra cost, the loss in camels abandoned on the road through weakness is far greater than along routes with better grazing. In other words, the route could not stand competition, were it not for the political factor. In my book "The Desert road to Turkestan," I have given some account of differences in methods of camel-mastery and caravan handling, between the trading caravans of the great routes and the local caravans of the Ala Shan.

Yet I think it fair to believe that the route may have been more favourable within the historical period. The evidence of the depressions or trough country that I have described shows it to be possible that within the past few centuries moisture was more plentiful along the route. The evidence of dead

tamarisks and old trees that are being succeeded by no posterity of new growth adds confirmation. Finally, there is a class of evidence which has little to do, directly, with change of climate, but which I myself think to be of considerable importance as bearing on possible changes of trade routes. That evidence is in the temples, or rather the lama monasteries, to be found along the route. Lamaism did not gain a strong hold in Mongolia until the reign of Kublai Khan, in the thirteenth century, so that no lama monastery can of itself boast an age of more than six hundred years or so. The sites of monasteries, however, may well have a much longer history as holy places. Any one acquainted with holy places in Central Asia knows that there is a tendency in a supplanting religion (as in the case of Islam in Chinese Turkistan) to occupy sites that were already recognized as holy under the earlier religion. A site may gain a reputation for sanctity for any one of a number of reasons; but the sites which tend to become centres of popular resort, and thence by a natural process of evolution the centres of important religious establishments, are those which lie on lines of travel.

There are two important lamaseries, Shandan and Tukomen, on the line of the Winding Road through the deserts of Ala Shan, and each of them appears to have enjoyed in the past the same sort of advantages that contributed to the past importance of Etsina, in occupying points where north and south routes crossed the line from east to west. Prjevalski went to the north from Tukomen, and he notes that the line from the north through Shandan was used by a convoy from Urga in 1873, which was bound for Tibet to seek a new Living Buddha, but did not dare follow the better-established route farther to the west, because of the troubles consequent on the Muhammadan rebellion against the Chinese.

A lama monastery is generally founded at a point which makes a good centre at which the nomads can gather for seasonal festivals. These festivals tend to become the scenes of fairs, and if the site is on a convenient crossing of lines of trade, permanent trading communities gather about the temple. Urga, Uliassutai, and Kobdo, the rudimentary towns of Mongolia, appear to have grown from such origins. Shandan and Tukomen appear to be sites which were once in a good way to acquire a similar importance (though of course in a less degree) and to have justified the building of large temples, housing several hundred monks or lamas; though at present the poverty of the surrounding country, and until very recent years the poverty of traffic, would in no way justify such large establishments. There are strong grounds for supposing that they were built on sites which had originally a much greater importance, and that this importance had not wholly vanished at the time they were built. Such an importance can only, I think, have depended on a comparatively flourishing trade route; for, though changes of climate may have occurred sufficient to account for the difference between a good caravan route and a bad one, conditions are not likely ever to have favoured large resident or even nomadic populations. Some minor support is lent to this theory by legends that I heard which implied the existence of stone monuments near the routes; monuments which would hardly have been executed except in a period of comparative prosperity.

West of the Edsin Gol the character of the route changes decidedly. It is

not likely ever to have been an important trade route in the past, for it does not lie on a natural line of communication that would in any historical period have linked important centres of trade. It appears to have been always an infrequent line of passage used by Mongols; perhaps in small parties on migration, but more likely only when hunting or raiding. It rises slowly to a bleak plateau, broken by small hills, which are often irregularly grouped but have a prevailing east and west tendency. The depth of bad desert country from north to south is here vastly increased, and communication must always have been difficult. The plateau is composed of hard, sandy clay, overlaid with black gravel in flat pieces. The hills are of the same formation and are covered with the same gravel, while occasional large pieces of fissile black rock show the origin of the gravel. Rainfall is practically unknown, and very little snow falls in winter. The hills are marked only by faint channels down which drains the moisture of the scanty snows or of rare summer cloudbursts, and in these are found the scant vegetation of tiny stunted tamarisks and a few dessicated shrub-like plants which are even smaller. Farther to the north the nearest animal life is in the Kuku-tumurten Ola, reported by Ladighin, a member of one of Kozlov's expeditions. To the south there is no route for many days' journey; at least no route that is practicable for trading caravans.

Leaving a well some 40 miles west of the West Edsin Gol, in what is already forbidding desert country, the route crosses a dry stretch of nearly 100 miles before the next well is reached. The swell of the plateau leaves no depression where it would obviously be possible to dig a well, though the caravan men believe that water could be struck, were a party to come out well enough supplied with water and prepared to dig long enough and deep enough. There is no grazing for camels except stunted, brittle tamarisks, and shrubs in which there is not a particle of sap. This is the Black Gobi, the Khara Gobi, in its full desolation. Farther to the north there is another practicable line of march, on which wild camels are reported, and where the grazing is said to be slightly better.

The crossing of this most forbidding part of the Black Gobi ends at a well in a pocket among hills. The plateau then breaks down a bit, and rises again to a lesser plateau, one slightly less sterile. In between the plateaus is a well called the Wild Horse Well, near which a few antelope range, and where wild horses are reported. We were accompanied from the Edsin Gol to the edge of the Black Gobi by small birds like crows, with grey hoods. In the desert itself I saw no bird life, but in the second stretch of desert, travelling for about 50 miles from the Wild Horse Well to the next well, I saw a small bird something like a woodpecker, called the tamarisk bird. The gravel in this minor stretch of the Black Gobi thins out; the flat black fragments are interspersed with quartz-like fragments.

This plateau again breaks down, this time into depressions filled with dried-out marshes, and the prospect is varied by the sight of hills, especially on the south and south-west, where they rise to a fair height, looking like a definite range, which is evidently the main range of the Matsung Shan. In this depression region I saw antelope, and sand-grouse (in migration); while wild ass and wild camel were reported. I saw also a large wild sheep, which had possibly been forced down by drought from the higher hills in the south, to

drink at the marsh. The region is accessible with comparative ease from Outer Mongolia. Somewhere through it passes the route of Ladighin from north to south; the only explorer's route of which I know in all the country through which I had travelled for more than 200 miles from the Edsin Gol.

This country is dangerous for caravans. It is known as a sort of no-man's-land, all the inhabitants being renegades, either desperate characters or men who have fled from different Mongol communities to escape tribal taxation. It is naturally adapted to be a refuge for lawless men, for it can support herds and flocks, yet it is not so attractive to peaceful nomads as the country more to the north and north-west. I think it quite probable, however, that it was strongly held by the Huns, as an outlying territory, during the long period when their power was centred on the Bar Köl range. We know the Huns to have raided in some force against the western marches of Kansu, and from this region the caravan men report a feasible line of march southward to Suchow.

The region rose to a position notorious for several years in Central Asian politics, but obscure to the outer world, during the period after the War when first White and then Red Russian partisans were carrying on a savage guerilla warfare in Mongolia, involving not only Russians but Chinese and Mongols. During this period a man who appears to have been a Mongolized Chinese, but who is remembered only by the name of "The False Lama," gained some measure of power in Outer Mongolia. Apparently when Soviet Russia began to assert a positive control over the affairs of Outer Mongolia, he thought it wise to flee, carrying with him a considerable following, some of them his own fighting men and others Mongols that he gathered up to form a population about him.

He established himself in this no-man's-land, built a stronghold of which the ruins can still be seen, and set to with great energy to open a caravan route and found, if possible, a trading city. He was the first to see the possibility of working out the Winding Road to replace the roads closed to Chinese caravans in Outer Mongolia, and thus maintaining the trade between Kweihwa and Chinese Turkistan. He brought up supplies from Suchow, gave safe-conduct to caravans free of charge, sold provisions at a low rate and took charge of any worn-out camels which the caravans were willing to leave in his protection. It is related that he first established the crossing of the Black Gobi now in use, and that he intended to dig a well to relieve the hardship of the worst stages.

Unfortunately, he was not popular among his own people, many of whom he had forced to accompany him and over whom he ruled with a strong hand. The prospect of his rise to power gave no little concern to the rulers of Outer Mongolia, and in the end he was murdered. The murder is said to have been carried out by a small band of raiders despatched from Urga, and it is also said that it could not have been accomplished without the passive acquiescence of some at least among his own subjects.

From the House of the False Lama, as the stronghold of the adventurer is called, we worked in and out among the foothills of the Matsung Shan. The name of these hills is said by the caravan men to mean "horse-hoof-print hills"—the Horseshoe Hills, as we should say. The prevailing formation is one of crescent-like bays among low hills. This brought us to a camping-

place of some importance, called Mingshui. I take it, tentatively, to be the Mingshui marked on many maps. It appears to derive from a map of the Germans, Holderer and Futterer, which includes a route of the Russian Obruchev; but it may not be the same place, as Mingshui simply means "clear water," and can be applied to any spring-fed well. It is a place where routes from Kansu and Outer Mongolia converge on the Winding Road; toward the west, two main lines of march diverge. One goes round the northern side of the Qarliq Tagh; this is the line of the Winding Road. The other goes round by the southern side of the Qarliq Tagh and reaches Qomul or Hami.

I take Mingshui to be the point, approximately, where Sir Francis Younghusband's route of 1887 crosses that which I followed, for he finished his camel-caravan journey at Hami.* It is remarkable that his route, striking enough in all conscience at the time it was made, has never apparently been followed by another traveller. It seems to have coincided for the most part, as I have indicated, with the Small Road, until the junction of the Small Road with the Great Road; then to have followed the Great Road until it had overshot the no-man's-land of which I have just been speaking, and finally to have made a traverse to the south and west, striking across country more or less, to round the end of the Qarliq Tagh and make for Hami. The final stages of this interesting route are, to my mind, the most remarkable; for they illustrate what I should like to point out as the essential feature of the true Mongolia-going caravan routes—they do not follow absolutely a fixed itinerary, but are really nothing more than a *direction of march*, governed by water and grazing and by nothing else except tribal hostilities or coalitions, or the shelter offered to raiders.

It may be that Sir Francis Younghusband made his Mongolian journey much as I did; that he simply consigned himself into the hands of his caravan men, demanding to be delivered right side up in Chinese Turkistan, but fussing very little about the exact route taken. If that is so, then I think I must be right in my guess that his men chose their route for reasons that correspond in an interesting way to those which led to my hitting on the Winding Road; the same reasons that led the Mongols to travel by an unusual route from Urga to Tibet in 1873 as noted by Prjevalski. This great journey of the first white man to travel through Mongolia and Chinese Turkistan to India was made just after the savage wars of the Muhammadan Rebellion, which led to a great deal of freebooting in Western Mongolia, owing to the presence in the Altai of a Muhammadan tribe, the Kirei clan of the Qazaqs. These men are always prone to exchange raids with the Mongols and to harry the caravan trade. During the Muhammadan rebellion they sacked Kobdo, and according to the tales current among the caravan men, made travel impossible in Western Mongolia. It is probable that they had not entirely quieted down after the suppression of the rebellion in Chinese Turkistan itself, and that for that reason Sir Francis Younghusband's caravan men led him into such an interesting route, rather than continue along the Great Road until they

*Since writing the above, Sir Francis Younghusband has been kind enough to show me his own route-survey. From this it is plain that my route converged again on his a good deal farther west than Mingshui; in fact on the outer skirts of the Metshin Ola, near the small oasis of Adak.

approached the Baitik Bogdo, a well-known haunt to this day of Qazaq raiders.

Shortly after leaving Mingshui we picked up sight, across an enormous hollow in the desert, of the everlasting snow on the peaks of the Qarliq Tagh: a stupendous vision, like the sight of a promised land. There is little else to record of the journey itself. I tried unsuccessfully to cross a snow-filled pass from Tur Köl, on the northern side of the Qarliq Tagh, to the Bar Köl basin. Failing this, I turned out along the outer flanks of the Metshin Ola, a buttress of the Qarliq Tagh, and eventually reached Kuchengtze. This was not accomplished, however, until I had undergone a detention of some fourteen days at a border post, a delay which entailed very difficult travelling with my small caravan through appalling winter weather. The entry into Kuchengtze was made just over four months after I had left Kweihwa.

In thus giving a fairly close survey of the physical characteristics of a particular caravan route, I have touched on two geographical features, the Gobi and the Altai, which play a great part in orienting the trade routes throughout Mongolia. In appreciating these trade routes, however, the geographical factor must be supplemented by two others, the social and the historical. The social factor is the prevalence throughout this geographical region of the nomadic culture or social order. It is responsible for the fact that the oldest trade routes in Mongolia appear to have originated not in trade but in the migrations of peoples. The historical factor is the contact between the tribes of nomadic culture and their neighbours of a different social order; of whom the most important appear always to have been the Chinese, not only as the nearest, but as the most solidly attached to their own civilization and the most widely distributed, along a strategic frontier which throughout history must have been of vital importance to the nomadic tribes.

This type of caravan route, originating in the passage of nomadic peoples, has been, I think, studied less and less fully understood than the other avenues of commercial, cultural, and military movement through Central Asia. In the first place, because of the social order of nomadic tribes, the sites of permanent occupation are rare, and archæological evidences comparatively scanty. In the second place, modern exploration has been devoted more to the cartography of mountain ranges and deserts than to the elucidation of routes, so that the routes of the explorers themselves have tended to cut across country to striking points of vantage. In the third place, the trend of exploration has largely followed the direction given by the early Russian travellers, who were concerned with traversing Mongolia in north-to-south lines, to elucidate its topography in relation to the political frontiers of Russia and China; thus cutting across rather than following the natural lines of communication. Lastly, the vagueness of even the most frequented routes in a country where travel follows the customs of the nomad rather than of the trader has made them less obvious to comparative study.

In some ways the historical approach to the study of these routes is even more illuminating than the geographical. Above everything else there stands out the historical phenomenon of the Great Wall of China, itself based on a sound geographical line of cleavage, and reinforced in part by the valley of the Yellow River. The bias which it gave to all the lines of communication in

Central Asia more than two thousand years ago has endured ever since. It was designed originally, we are told, to turn back the inroads of different Hun tribes which at that time threatened China from Mongolia; a threat which must evidently have been developing for an appreciable period, and have constituted a menace of the first order. It might give a clearer idea of the truth to say that the Great Wall was an attempt to establish a permanent cultural demarcation between the lands of the nomad tribes and the lands held by settled people. I need not attempt to enlarge on the relations between the Chinese and the nomad tribes, Hun, Turkish and Mongol, which broke in successive waves against them. I should like merely to stress the function of the Great Wall, during some two thousand years, in determining, however roughly, the frontier between two types of civilization. It has often been pointed out, sometimes with a good deal of contempt, that the Great Wall was awkward to defend, easily penetrated by invaders with any real instinct for warfare, and easily turned when once penetrated. We should not, however, allow such criticism to obscure the true worth in history of this colossal achievement in defensive engineering. To begin with, its construction dates the rise of a power of resistance in the unwarlike civilization of China; and it was this power of resistance, deflecting the aggression of the Huns, which gave a westward trend to the whole period of the Great Migrations, throwing against the Near East and Europe the destructive weight of the barbarian hordes.

Later, the Great Wall formed a *point d'appui* in the frontier policy of the Chinese. The actual frontier varied according to the amount of pressure bearing on it, alternately from the Chinese on the south or the barbarians on the north and north-west. At different times invaders established non-Chinese kingdoms in Kansu, Shensi, Shansi and Chihli. Some of the waves of conquest swept into China with sufficient momentum to penetrate even farther, and resulted in the founding of dynasties that controlled the whole, or practically the whole, of the country. These fluctuations, however, are overborne by the fact that nomadic peoples overpassing the military barrier of the Wall have in practice always recognized it as a frontier of civilization. They have always faced about to defend it, and they have tended to become merged in the civilization they found within it, adapting their own social order to the possession of tilled fields and walled cities. They have all become Chinese, and the lands they mastered have never been considered anything but Chinese, in spite of differences of dialect and racial type.

The only open land frontier in China is the Central Asian frontier. On the Chinese side of the Great Wall there have always been roads radiating from the centre of the country and approaching that frontier. The most celebrated of all these roads is the cardinal route commonly known as the Imperial Highroad. From classical and pre-classical times it led from Central China through Shensi and Kansu and ultimately toward Turkistan and the countries known vaguely to the Chinese, from the most ancient times, as the Western Regions. Other roads led northward toward Mongolia; by the approach of Wutaishan and Tatung through Shansi; by the Kweihwa approach north of the great bend in the Yellow River; by the Jehol approach through northern Chihli; and by the Shanhaikwan entry into Manchuria.

Fruitsellers in small town of Chinese Turkistan

Camp and caravan dog, western Edsin Gol

Qazaqs fording Tekes river, Tien Shan

Camels on iris-grown prairie by salt pool of Ulan nor, north of Kweihwa

Ssu Ta-tze Liang (Dead Mongol Pass) between Tur Köl and Basin of Bar Köl

All these roads have the character of what we may call true roads. They are as normal as Roman roads. They are adapted, wherever possible, to wheeled traffic, and to the orderly supervision of officials and tax-collectors. They follow lines of least physical resistance. Shelter for travellers is not limited to tents, but is provided at inns, at regular stages. Food for travellers does not have to be carried, nor do transport animals have to depend on grazing, but provisions and fodder are gathered from agricultural communities situated along or near the road and made available at the regular halting-places.

It is this character of the normal roads which distinguishes them from the caravan routes of Inner Asia. North of the Great Wall routes are determined by two classes of desert conditions, which may conveniently be distinguished as the oasis-desert, where people are settled in fixed communities, and the pastoral desert, where people live as nomads. The first is utter, irredeemable desert, what Sir Aurel Stein calls "true desert," and the Old Testament a "howling wilderness," but broken by oases. Each oasis is isolated, and its population relies in the first place on the resources of the oasis itself, and in a lesser degree on trade with other oases. In such conditions the trade route retains a strong resemblance to the normal road. Transport is concerned with the special difficulties of bridging gaps of desert and of providing food and other necessaries between the oases. Trade, however, continues to move between fixed points, and because these points are fixed, the lines of communication tend to become fixed channels. Roads adapted to the type of desert broken by oases prevail throughout southern Chinese Turkistan, and in comparatively modern times have been extended into northern Chinese Turkistan. The roads evolved under the conditions of the pastoral desert must conform to totally different requirements. These are the roads that have prevailed throughout the historical period in Mongolia, and until the recent past must have been typical also of what we call Dzungaria and of northern Chinese Turkistan.

In these regions we depart altogether from the canons of the normal road. Routes, in fact, are no longer roads designed to communicate between fixed centres of population. They become, rather, general directions of march. Each direction of march is determined by the needs of a migrant population, moving not from one oasis to another but between vaguely defined areas. The areas themselves are determined by prevailing geographical conditions. They are not selected in the first place with regard to the potential development of trade, but because they meet the needs of flocks and herds. Men go where their cattle and sheep must go, and such trade as later develops must be able to follow the wandering men.

Throughout Mongolia and Dzungaria, over territories larger than all Western Europe, it is the lack of oases that has controlled the activities of human society, inevitably requiring the evolution of nomadic tribes. There are no mountain ranges (except a portion of the Altai) with large glaciers and large beds of perpetual snow, sending down into the desert streams from which oases can be formed. The prevailing climatic condition is one of sub-aridity, producing enough grass to support flocks, but requiring migration if the flocks are to enjoy the best available pasture throughout the year.

It has been roughly estimated that about a fourth of Mongolia is either

utter desert, or so arid as to invite the occupation of only the poorest nomads. Not all of the remaining three-fourths are arid enough to compel nomadic pastoral life, without the alternative of settled occupation. Every important mountain range appears to be a centre of good climatic conditions, including a regular water supply, from which the climatic lines radiate outward and downward, through arable land and steppe country to sterile desert. This, however, is a physical structure which makes the mountains centres on which nomadic life converges, rather than barriers separating one climatic region from another. The tendency to a nomadic life, therefore, has always dominated the tendency of society to attach itself to particular localities and develop the culture of fixed communities. Well-favoured regions exist in Mongolia where agriculture is quite possible. Still more favoured regions are to be found, with abundant forests, good arable land, and easily worked mineral deposits, where it might be expected that men would readily turn from the nomadic life to one of permanent occupation. Historically, however, it has always been difficult for a minority to settle in such regions, because they lie open to regions in which a conversion from the nomadic to the agricultural life is not likely, and the accumulated wealth of settled inhabitants would provoke raids from the wandering tribes.

It is evident that there have been attempts in Mongolia to break away from the nomadic tradition. In the fertile part of northern Mongolia, where numerous lakes and rivers drain toward Siberia, many tumuli and stone monuments indicate that the country was once held by the Uighurs, who appear to have been the central stock of all the Turkish tribes, and the first of the Turks to adapt themselves to agriculture and permanent habitations. The Uighurs, apparently, first showed a tendency to settle down while in this region, but they were dislodged by the tribes whose modern representatives are the Qazaqs, and after migrations which took them first westward, in the direction of Chuguchak or perhaps farther, they pitched at last on the northern flanks of the Tien Shan, which form the southern rim of Dzungaria. There they speedily adopted agriculture and rose to a high degree of culture. Their capital is supposed to have been near the modern Urumchi, and they even spread beyond the Tien Shan to Turfan, which is in the true zone of oasis-culture.

An analogous and much more complete example of the conflict between the nomadic and settled cultures can be seen at the present time in the Ili region, which lies, like Urumchi, on the northern side of the Tien Shan, but is more accessible from countries that have always been peopled by nomads, and is much nearer the central corridor of passage used in the great historic migrations. The valleys of the Ili river and its affluents offer every advantage for the development of agriculture and town life. It is even apparent that settled communities flourished there during the past; but only at intervals. At the present time, it is evident that the whole country has been overwhelmingly dominated by the nomadic culture for a number of centuries. It lies too much open to the inroads of nomadic tribes, and all the great westward migrations in sweeping by it on the way toward the steppe country of southern Siberia and Russian Central Asia, overthrew the successive efforts at the establishment of permanent communities.

In the zone of oases, on the southern side of the same mountains, the permanent communities were never uprooted. They were open to raids from the nomadic tribes, but they did not invite nomadic occupation because the absolute desert intervening between oases did not favour the passage of nomads with all their cattle and transport. Different phases of indigenous civilization were damaged by these raids, but the communities persisted. In this they offer an historical contrast with the Ili country, where after the gradual subsidence of the great migrations, agriculture and city-building may still be seen in the initial stages of development. Indeed, what development there is may be ascribed entirely to the peaceful immigration of Chinese colonists and settlers from the oases across the mountains. The people of the country, the Qazaqs, who represent the long succession of nomadic invaders, are only beginning to modify the nomadic traditions which were necessary to their survival during such a prolonged period, and to cultivate a few catch crops. Many of them are farmers and flockmasters by turns, with only the poorest tending to attach themselves permanently to the land, thus representing the actual process of transition between two social orders.

In order to understand the Mongolian caravan routes, which I have classified as "directions of march," it is essential to arrive at some idea of the migrations which first worked out their geographical possibilities. It is well enough established that most Mongols are only semi-nomadic, moving ordinarily to high pastures in the summer and to low, sheltered regions in the winter. They derive obvious advantages from restricting as far as possible the orbit of migration, husbanding their flocks and herds by moving them only to obtain shelter or a change of pasture. The essential thing about them, in fact, is not that they *do* move, but that they *can* move. The structure of their habitations, the quality and quantity of all their belongings, are conditioned more by the necessities of the short seasonal migrations than by the conveniences they might otherwise elaborate during the comparatively long periods when they do not move their camps. Given a sufficient impulse, there is no limit except the presence of grass and water to the possible range of their migrations.

The Mongols, in the past, very probably did not wander to any greater distances than they do at present. There is no reason to suppose that their habitual migrations covered enormous distances even in the periods immediately antecedent to the wholesale migrations which affected so profoundly the history of both Europe and Asia. It can hardly be doubted that the cause of these huge displacements of whole populations must be sought in climatic changes. The geological evidence, I understand, points to a steady desiccation of Mongolia and the adjacent regions of Central Asia. The researches of Professor Ellsworth Huntington have, I think, gone a long way toward establishing the theory that this prevailing tendency has not been absolutely uniform within the last 2000 years. In other words, the graph of desiccation is not an unbroken curve, but is broken by relapses toward moister climatic conditions, if I may so phrase his theory of "climatic pulsation."

Among the most interesting findings of Professor Huntington are the figures he quotes from Australia to illustrate the effect on pasturage, and consequently on sheep and population, of rainfall in semi-arid regions. "According

to Hann," he says, "a rainfall of twenty inches a year in New South Wales makes it possible to keep over six hundred sheep on a square mile of land; with a rainfall of thirteen inches only about a hundred can be kept; and with ten inches only ten sheep." A decrease of 35 per cent. (from 20 inches to 13) in the rainfall, that is, means a decrease of over 80 per cent. in the number of sheep that can be kept in the territory affected.

It would not take nearly so great a fluctuation of climatic conditions to start a people like the Mongols on migrations far more extensive than their normal spring and autumn orbit. They would either have to resign themselves to the loss of a great part of their stock, and to hardships that would severely diminish the population, or strike out to extend their grazing grounds. In such a search for new pastures each tribe would naturally find itself brought up short by the neighbouring tribes until, the pressure becoming more insistent, a movement of cohesion set in, and the united tribes pressed forward in common hordes.

Naturally, no such period of drought would set in abruptly; the pressure would increase gradually until an impulse toward general migration gathered way. After the pressure of population had been relieved, a period of repopulation would naturally set in; and during such a period, especially if the climate underwent for a period of several generations a slow reaction toward better conditions, it is easy to see how a great reserve of nomadic tribes could again be gathered in Mongolia. These in turn would be set in motion when the next "pulsatory" period of increasing drought recurred.

The cyclical process of migration and recuperation seems to have been terminated finally by an artificial measure; and that measure, curiously enough, was first applied under Kublai Khan, one of the greatest Mongol emperors. It was he who first encouraged the spread of Tibetan lamaism in Mongolia, hoping that it would act as a civilizing agent. The ultimate effect of this debasing religion was to withdraw an enormous percentage of the able-bodied men from active, productive life, and both to check the reproduction and drain the wealth of the race. The degenerative action of lamaism, however, did not take effect until much later; the period when the Manchus conquered China was the last period in which a general migration nearly came to a head. The campaigns of the Zungars or Western Mongols in the seventeenth century, almost rivalled the conquests of the Manchus, and had they not been checked by the Manchus might well have drawn all the Mongol tribes after them in a last assault on civilization. The Manchus, however, were the last conquerors to lodge themselves within the Great Wall, and they defended their conquests to such purpose that no general invasion has since threatened the Great Wall. After breaking the power of the Zungars or Ölöt Mongols in the west, and the Chahars in Central Mongolia, they continued the policy of favouring the lama church, until it had gained a hold on the Mongols from which they are never likely to recover. At the present time, whatever the progress of desiccation in Mongolia may be, it is not likely to impel the tribes to migrations of conquest. Saturated with lamaism, the Mongols are not increasing in numbers; indeed, many observers believe that they are actually decreasing. The population of the country is far below the number that even the arid territories might support.

The first migration from Mongolia of tidal proportions, that of the Hun tribes, appears to have taken place about the dawn of our own era, at a period when the power of the Chinese was also in the ascendant, and the Great Wall frontier was being asserted. The power of resistance which it represented gave the migration a set that took it to the north-west, away from China and the settled country and into the Russian steppes. There is ample evidence in history to show that this initial westward drift, though confirmed by subsequent migrations, was concurrent with periodic backwashes that affected China and northern Chinese Turkistan. Strong Hun tribes were established for a long time in the Bar Köl Tagh, dominating the obvious trade-route approach from Kansu province to Qomul (Hami) Turfan and Urumchi, and forcing the Chinese to work out the more difficult "silk road," the classical route through the wastes of Lop Nor into southern Chinese Turkistan.

A survey of the Great Wall frontier and of the mountains and deserts of Mongolia shows convincingly why the nomadic tribes, whenever Chinese resistance was at all formidable, found it more satisfactory to carry out the prodigious migrations which carried them to the north-west, into the Russia steppes and thence into the nearer east and Russia. Northward from the Great Wall a system of zones appears. First, following roughly the Wall itself, there is the zone of the marches, an area of fusion between settled Chinese and nomadic Hun-Turkish-Mongol culture. In the west this zone is wide and vague, fortified by outer desert buffers. In Ala Shan the Chinese influence reaches far to the north. In the Ordos region, which is like an elbow of Mongolia thrust into the ribs of China, the Mongol influence penetrates far to the south. Farther east, between Ala Shan and Manchuria, we have what is now known as Inner Mongolia proper. Here again the Great Wall frontier, though standing in the main, has frequently been overpassed. Nomadic tribes at different times have seized large parts of North China, tending to merge themselves in the Chinese culture, but leaving strong traces of their blood and probably modifying also the dialects of spoken Chinese. At the present time the Chinese in their turn are encroaching to the north, occupying belts of arable land formerly held by the Mongols.

North of the marches and Inner Mongolia is the Gobi, a zone in itself and the only frontier in Mongolia that is of itself a barrier. North of the Gobi there is the zone of Central Mongolia, geographically contained in the basins of the lakes and rivers flowing into, or trending toward Siberia. In the west there is the zone of the Altai, and lastly the zone of northern Turkistan and southern Dzungaria, lying between the Altai and the Tien Shan and forming the zone of transition between the true nomad country and the oasis-country of southern Turkistan. The geographical relation between these zones is one in which they do not cleave apart on lines of strict division, but merge into one another. Most important of all, the mountain ranges in general are at the centres of their zones, so that historically they have served not as dividing barriers but as strongholds and rallying points. The zones, taken all together, have such a geographical unity that historical causes felt in one zone have had immediate repercussions throughout the others.

The tribes inhabiting these zones are controlled in their lines of communication by an axis of deficient water and grazing up and down the length of the

Gobi, and two axes of water and grazing, one along the Altai and one farther north. The great sweep of the main Gobi, from south-west to north-east, must always have served as a secondary outwork to the defensive system of the Great Wall. The terrain itself was too difficult for either Chinese posts or nomadic tribes ever to occupy it in strength. At the same time, it created a gulf between the marches, or Great Wall front, and the steppes of Outer Mongolia which were naturally the most favourable assembly-ground for great nomadic hordes.

On the hither side of the gulf, in what is now Ala Shan and Inner Mongolia, there is not room for nomadic tribes in formidable numbers. There must, in consequence, have been a tendency among the minor tribes between China and the Gobi to distinguish their particular interests from the general interests of the major hordes to the north of the Gobi. That such an attitude would be a natural one is proved by the way that the Inner Mongolian tribes threw in their lot with the Manchus at the time of the Manchu conquest of China.

The Manchu irruption was itself only the most easterly phenomenon of a phase of universal unrest throughout Inner Asia. Had they not been forestalled by the success of the Manchus, the Mongol campaigns, which were being headed by the Ölöt Khans in the west and Likdan Khan of the Chahars in Central Mongolia, might have eventuated in irruption: a series of attacks on the Chinese from the north, and simultaneously a migration of conquest from western Mongolia into the Russian steppes. The first wave of migration, the last migration of the Mongols on a large scale, had already been launched. The Torguts of the Tarbagatai, Ölöts themselves, but at odds with the Zungars and the main body of the Ölöt tribes, had set forth for the Volga, from which they were to return seventy years later after the pacification of Inner Asia by the Manchus; and the way was clear at Chuguchak, which has always been the nomads' gate, for further migrations in the direction of Russia and western Central Asia. The tribes of Inner Mongolia, however, threw in their lot with the power that approached them from Manchuria and China rather than the powers at work in the steppes of the greater hordes, in Outer Mongolia, and the Manchus were thus able to buttress the Great Wall frontier and consolidate their conquests.

Along the Altai range there is an axis of water-supply, running from north-west to south-east and fading, beyond the Gurbun Saikhan and Hurku, into the waterless axis of the Gobi. The Altai do not have such a commanding relation to the arid country of Mongolia as the Kunlun and Tien Shan have to the inner basin of Chinese Turkistan. Except in the limited high crests of the range, far to the west, they do not hold sufficient reserves of ice and snow to nourish outward-flowing streams that gain in volume as the heat of summer increases. Nevertheless, they provide a climatic range. As the snow melts on them in summer, flocks can be sent up towards their crests in search of summer pasture. More important still, along their flanks are to be found unfailing lines of wells. The streams originating in the Altai, the eastern Altai especially, do not have sufficient volume to flow far above ground. They sink into the piedmont gravel glacis that buries a great part of the lower flanks of the range; but, protected thus from evaporation, they continue to flow underground. Below the gravel glacis the water, tending toward the surface again, supports

pasturage, and, by detecting the channels of underground flow, wells may be sunk that furnish a good supply of water. Thus it is possible either for nomads or for trading caravans travelling in the nomadic manner to follow directions of march parallel to the Altai, sure of water and sure of grazing, and at the same time avoiding passes and difficult marching country.

These corridors north and south of the Altai are fair examples of the evolution of the caravan route from nomadic "directions of march." By continuing on the southerly and westerly side of the Altai, the direction of march can be carried all the way to the Tarbagatai country and the verge of the Russian steppes. On the northerly and easterly side a similar line can be followed, if anything even more favourable to the passage of large bodies of transport animals, flocks and herds, except for final passes over the Altai rising to about 8000 feet.

Yet another direction of march, offered by the Khangai ranges, links the central steppes of Mongolia with the Altai. Beyond that, passage to the north, into Siberia, is barred by the dense forests of the Yenisei basin and the Syansk range. Even tribes migrating from north-eastern Mongolia into Siberia would find their passage westward barred by lake Baikal, and, in fact, the only important Mongol tribe that ever established itself in that part of Siberia appears to be the Buryats, whose lands are east and south-east of lake Baikal.

In the east of Mongolia the Khingan range appears to be less a barrier between Mongolia and Manchuria than the backbone of an extreme eastern zone of Mongolia, which is roughly the last district in that direction inhabited by nomads of the Mongol or pastoral type. Beyond them there appear to have been, throughout the past, nomads of a different type, the Tungus tribes, among them the ancestors of the Manchus. They belonged to the hunting, fishing, and forest-roving order of primitive people, whose territory, by reason especially of the forests, is necessarily less open to the passage of shepherd nomads than either steppe country or such civilized country as North China.

Thus the natural directions of march in Mongolia appear to be predominantly from east to west and from south-east to north-west. All of them converge on the Tarbagatai range and the valley of the Emil, in which stands at the present the town of Chuguchak. The Tarbagatai, linked with the Barlik and Ala Tau ranges, offer a traverse to the northern Tien Shan and the rich steppes about Issiq Köl. On the route south of the Altai a similar traverse is offered from the Baitik Bogdo range across an easily negotiable trough of desert to the eastern Tien Shan in the neighbourhood of Kuchengtze. The route still farther south, that which I followed through the heart of the Gobi, is quite evidently exceptional. Even if, as I myself suppose, water and grazing were in time past more plentiful, it can have served only to communicate between the Edsin Gol and the northern bend of the Yellow River. West of the Edsin Gol no nomadic direction of march can ever have been practicable. The importance of the route must have depended in the main on its junction at the Edsin Gol with a corridor to the north, into Outer Mongolia.

Granted the alignment of these directions of march, it is obvious that any effective resistance from the Chinese on the front of the Great Wall must have diverted the nomad tribes, at the periods when increasing drought impelled them to migration in search of new lands, toward the west. Converging by all

the routes on the nomads' gate in the valley of the Emil, they swept into the Russian steppes and thence diverged all over western Central Asia, the Near and Middle East, Russia and Europe. Only at such periods of prodigious expansion as the upheaval under Jenghis Khan and his grandson Kublai did the Mongols make wide conquests in China; and even then the number of Mongols diverted to the subjection of China must have been small compared to the hordes that under such a leader as Batu Khan alone poured out to the overthrowing of Russia.

The development of trade routes along such avenues of nomadic passage must have been slow in the remote past, when the tribes were unsubdued and the hazard was increased by outbreaks of tribal warfare. Caravan trade can only have existed as an adventurous kind of barter, carried on by men leading their convoys tentatively along the routes of migration, passing at their own risk from the restricted orbit of migration of one tribe into that of the next. For evidences of trade of a more organized kind, at the earlier periods of which we have knowledge, we must cast farther to the west, to the regions that centre on the basin of the Tarim river. These routes have been discussed in such a masterly way by Sir Aurel Stein that I should hesitate to make more than a running comment on them; enough only to bring them into relation with the routes of nomadic origin.

I take for granted an acquaintance with the physical conditions: the central desert, the enclosing mountain ranges, the streams breaking down through gorges from the mountains and permitting the irrigation of land in such limited zones as can be fed with water from canals and ditches. The human factor can be summed up as one of oasis-culture. The routes connecting oases are, primarily, trade routes. Owing to the absolute desert so frequently intervening between one oasis and the next, the lines of communication are not naturally adapted to the movement of peoples in migration. Even military conflict must be abnormal. The human tendency toward expansion is, among the people of such an oasis-culture, sufficiently gratified by developing the transport of goods. They are not easily impelled to abandon one set of farms in one oasis merely to sally across a desert and occupy similar farms in another oasis.

One point, however, which appears to me of great significance, has never been touched on by the authorities who have worked over the routes of the oasis country. That is the tendency toward what I should like to call tentatively a perpendicular as against a horizontal development of civilization. The normal tendency of all settled peoples is to expand laterally into touch with their neighbours, to provide an exchange of commodities. The peculiar geography of the inner basin of Chinese Turkistan encourages a different tendency.

The typical oasis of southern Chinese Turkistan is placed near the end of a river flowing from the mountains into the desert, at a point where the flow of water retains impetus enough to be carried out fan-wise in irrigation ditches. The typical river, if traced upward, is found to break down through an outer, desert barrier range, beyond which it can be followed up into more fertile mountains. This vertical construction, of fertile mountains, barrier range, desert and oasis, is more pronounced along the flanks of the Tien Shan than

Irrigable valley at foot of desert barrier-range, Turfan depression

Ruined fortress of the False Lama, Matsung Shan, W. Mongolia

Qazaq moving camp, with yurt framework packed on bullocks

Felt yurt of Qazaqs, at mouth of Köksu gorge, Tien Shan

along the Kunlun, but it is characteristic of both. The high mountains may produce timber. They always produce gold and other minerals, and offer a certain amount of pasture. There is, consequently, an incentive to trade between the mountains and the oasis. The people of the mountains bring down wool, hides, and metals to exchange with the people of the oasis for grain, cloth, and such rude manufactures as can be better developed in a town than in the mountains.

Thus each oasis tends to develop a self-contained trade and civilization, passing vertically up into the mountains and back. Vertical communication is, it is true, more difficult than lateral. The passage of the mountain gorges is commonly so difficult that the peoples of the plains and of the mountains do not merge into one polity. Those in the mountains remain pastoral and even semi-nomadic, while those in the oasis remain farmers, town-dwellers, and artisans. Yet the diversity of the products that can thus be exchanged is much greater, and therefore more stimulating to trade, than the diversity of products to be exchanged laterally, between oases. Lateral communication is likely to thrive only with the development of a through traffic, as opposed to local traffic: such a traffic as is, in fact, known to us from the great historical periods, as when, for instance, the Chinese built up the trade of the Silk Road.

Indeed, nothing is more obvious than that the people who turned the local routes of the oasis zone into important channels of communication between different races and different civilizations were not the oasis people but the Chinese. In periods like the Han and T'ang dynasties, when China was a great power, the Chinese thrust westward, throwing their weight into Inner Asia. I think it fair to assume, on the evidence from a number of sources, that the Chinese were not primarily concerned with conquest in the inner basin of Chinese Turkistan.

No single fact is of more significance than that the first organized effort of the Chinese to penetrate the Lop Nor deserts, reach the zone of oases and open communication with the Western Regions should have been the celebrated mission of Chang Ch'ien. This mission was despatched toward the end of the second century B.C., to seek an alliance with the Yueh-chih or Indo-Scythians, against the Huns. The Great Wall had been completed during the hundred years preceding the mission. The Chinese had not only been establishing a front along the Mongolian border against the Hsiung-nu, or early Huns, but had reasserted themselves in what is now Kansu province, and that part of Kansu especially which appears on the map as a corridor running past the foot of the Nan Shan toward the Western Gobi. The Hsiung-nu, or Huns, had not long before displaced the Yueh-chih in this very Kansu region, forcing them to migrate far to the west, toward Transoxiana, whither Chang Ch'ien went to seek them out, hoping—a hope that was disappointed—to ally them with the Chinese against their common enemy the Huns. Finally, it should be noted that to complete their turning movement which had pushed the Huns away from China, the Chinese had carried a supplementary fortification (the celebrated *limes* discussed by Sir Aurel Stein) from the Great Wall in Kansu right away to the Lop Nor basin.

In fact, it appears that the initial entry of the Chinese into Inner Asia was

to gain a foothold that would enable them to manipulate the nomadic barbarians of contiguous regions, to maintain the north-westward drift of migration, and prevent a recoil toward China. Trade, it is fairly plain, did not precede the flag, but followed it. After Chinese embassies and missions had begun to pass among the oasis peoples, carrying rich gifts of Chinese produce to impress them with the power and wealth of China, they came in touch with the regions beyond, which are now Russian Turkistan and Persia: regions much richer in potential trade and revenue. Still farther to the west were even more valuable markets for Chinese products, especially silk—how valuable, we can divine from classical and post-classical references to silk and the "silk-weaving Seres," who were none other than the Chinese, standing behind the shadowy kingdoms and powers of Inner Asia.

Thus the development of trade routes in the zone of oases appears to have been, throughout history, dependent on the introduction of through traffic from exterior regions. The mere falling away of through traffic, however, would by no means account for the pronounced evidences of decay in the inner basin of Chinese Turkistan. To account for the abandoned cities far out in the desert, and the withdrawal of population to points nearer the source of water supply, we must approach again the vexed problem of desiccation.

It has been much debated how far the ruins of Chinese Turkistan were due to local causes and simple abandonment, and how far to a widespread dislocation of human life by general desiccation, entailing great movements of peoples and destructive wars. I venture to think that some light may be cast on this by a consideration of what I have called the vertical structure of society in Chinese Turkistan. It may be that such a structure could account for destruction as well as for development. During a period of drought, or the recession of ice-caps in the high mountains causing a diminution of the rivers, the oasis people would tend to move up the rivers, nearer to the source. At the same time the pastoral mountain people, under pressure of the same causes, would be impelled to move downward and even to raid the people of the plains in the effort to secure a larger supply of food than they could purchase with their diminished power of barter. Neither in the mountains nor on the plain would lateral movement, or true migration, relieve the pressure, because of the difficulty of movement which would mean the abandonment of all heavy transport. It could well be argued, however, that such regional conflict might originate without a direct climatic cause. The migrations of the nomadic tribes, sweeping by on the other side of the mountains, might so dislocate the "through traffic" of which I have spoken, that a resultant economic slump would precipitate local wars.

That the painful relief of the pressure of population by war and slaughter was effected on these restricted vertical lines, up and down between plain and mountains, appears likely from our broad knowledge of the great lateral migrations, which carried the nomadic people to such enormous distances. To take only one example, a late one, the Mongol conquest of Chinese Turkistan does not appear to have moved along the trade-route line from oasis to oasis, on the southern flanks of the Tien Shan. It seems to have swarmed along the northern flanks of the range, where continuous pasturage was available; then, when they had mastered the whole northern line, they could strike back across

the mountains, descending to and conquering each individual oasis by a vertical descent along the river that supplied it with water.*

One remarkable change in trade routes must be noted, because of its importance in linking the routes of nomadic origin with those of the zone of oases. This is the Tien Shan Pei Lu, the "Road North of the Heavenly Mountains." It runs along the northern foot of the Tien Shan from the terminal Bar Köl Tagh to the Hsi Hu (Shikho) oasis, where it divides, one branch continuing along the Tien Shan and one traversing to Chuguchak. It is essentially a route linking oases, not one suitable to the passage of nomadic hordes. Its historical importance is that it lies roughly parallel to the true line of nomadic passage, which skirts the southerly slopes of the Altai and arrives at Chuguchak by a line providing continuous pasturage, and that it gradually supplanted this nomadic route.

This change of routes, probably originated in the seventh century A.D., when the Chinese under the T'ang dynasty gained for a period control over the eastern Tien Shan, may be said to mark the turn of the tide, and the ascendancy of settled civilization over the nomadic culture. It is true that later migrations reasserted the supremacy of the Altai route, but at intervals trade and wealth were diverted again to the foot of the Tien Shan, and at the present day the true arterial routes of Chinese Turkistan are recognized to be the road south and the road north of the Tien Shan, both the nomads' direction of march along the Altai and the Silk Road through the wastes of Lop Nor having fallen into desuetude.

Not until comparatively late in history was real coordination effected between the trade routes of China within the Great Wall, the oasis-marked routes along the Tien Shan and the caravan routes that had succeeded to the nomadic directions of march. In every movement toward coordination the culture of the Chinese predominated. Even such influences of culture as those that accompanied the religions imported successively into Central Asia —Buddhism, Manichaeism, Nestorian Christianity, and Islam—were speedily assimilated, in every material respect, to Chinese influences. It is even more noteworthy that the periods in which Chinese influences were most widely paramount were those in which the Chinese themselves were ruled by alien masters—the Mongols of the Yüan dynasty in the thirteenth and fourteenth centuries, and the Manchus of the Ta Ch'ing dynasty, whose downfall a few years ago has been followed by a weakening of the Chinese power in every territory beyond the Great Wall, and in Tibet.

In such periods only could it have become profitable and safe to trade on routes that crossed Mongolia from south to north, such as that from Kalgan (or alternatively Kweihwa) to Urga, and thence to Kyakhta on the borders of Siberia, traversing the general lines of communication and the general delimitation of zones. A significant proof of this is that the traditions of the caravan men of the present day ascribe to the great Manchu emperor, K'ang Hsi, who set in final order all the affairs of the new empire, every tradition and custom of theirs which marks them off from ordinary Chinese.

*Additional evidence that the great periods of wholesale migration had an indirect rather than a direct political effect on the inner basin of Chinese Turkistan is provided by the anthropometric data gathered by Sir Aurel Stein, which apparently indicate that racial type in the oases has varied inconsiderably throughout history.

At different times in the long, dark centuries that preceded such periods of splendour—times when the impulse toward migration and conquest lagged for awhile—those directions of march which were afterwards to become arterial caravan routes must have seen the passage of envoys and missions, going between the lords of tribal dominions, or between the Chinese and different powers and princelings of Inner Asia. The bearing of gifts is hard to discriminate from the origins of trade, and trade, of such a venturesome kind, must often have started up and died away again during that spectacular succession of troubled centuries. Only when the turbulence of Inner Asia had thrashed itself out in innumerable migrations and wars were these routes gradually made conformable to their present service.

The link between that past and our present survives in the trading caravans, which camp in solitudes that once saw the passage of migrating hosts: the fighting men in the van, and the rear brought up by tents and baggage, women and children, herds of ponies, camels and cattle and flocks of slow-moving sheep. The men of the caravans themselves represent the people of the march country, adjacent to the Great Wall, in which there has always been a mingling of influences, between the nomads and the settled Chinese. They are borderers, men of no-man's-land. Their ancestors for uncounted generations, though alternately harried by barbarian raiders and cowed by Chinese tax-gatherers, must always have served, as opportunity offered, to further trade and the intercourse of nations. In the same way they themselves continue to carry trade, and trade of much the same kind, although dragooned by Chinese militarists and plundered by Mongol, Chinese and Muhammadan bandits.

I find it a matter of pride to have travelled among these men on a level footing, hardship for hardship and danger for danger. It is my most sincere hope that I may have been able to interpret something of their spirit and tradition; for their survival and their obscure but noble calling do more than anything else to illuminate and give meaning to the ancient routes they follow.

DISCUSSION

Before the paper the PRESIDENT (Col. Sir CHARLES CLOSE) said: It is our privilege to-night to listen to the third Asia lecture. These lectures owe their existence to the generosity of the Rev. Mr. Dickson, who is with us to-night and who was kind and generous enough to found these lectures about five years ago. Since then each alternate Session has commenced with an Asian lecture. The first was by Sir Aurel Stein, when he gave us a remarkable and very full account of Innermost Asia; while the second was delivered by Dr. Roy Chapman Andrews, who brilliantly described an expedition which the American Natural History Museum had sent to Mongolia.

To-night Mr. Owen Lattimore is to discuss the journey which he took in Southern Mongolia along a route which has never previously been explored. The three lectures have, roughly, dealt with the same part of the world: that is to say, to the north of China and Tibet and to the south of Siberia; they are, as it were, *en echelon*. Any one who desires to learn about that part of the world cannot do better than study the two previous lectures together with that we are about to hear to-night, of which I have had the pleasure of reading a proof.

Mr. Owen Lattimore has been many years in China and has learned the Northern Chinese dialects. He was, therefore, able in a very remarkable degree

to identify himself with the people with whom he travelled. Mr. Lattimore started from Peking and eventually arrived in India, though, if I understand rightly, he looked upon the end of his journey as being about 1000 miles north of Lhasa. It was a point which most of us would have been very glad to have reached by other means. Mr. Lattimore chose the most difficult route possible, and got through. He was joined on the borders of Russian territory by Mrs. Lattimore, who also had a most interesting journey, but will not speak to us about it to-night.

Enough has been said by me to show how very valuable these Asia lectures have been in increasing our knowledge of that great continent, and when we have heard Mr. Owen Lattimore's lecture we shall have learned a good deal more about Southern Mongolia than was ever known before.

Mr. Lattimore then delivered the lecture printed above, and a discussion followed.

The PRESIDENT: The lecturer's route crossed that of Sir Francis Younghusband. We should be very glad to hear Sir Francis.

Sir FRANCIS YOUNGHUSBAND: The lecturer told us that his very faithful servant, Moses by nickname, advised him not to speak the truth. Well, I think he has taken that advice to heart. At any rate, although he has this evening told us some of the truth, he has not told us the whole truth; he has not told us the tremendous hardships that he must have gone through in following the Winding Road across the desert. My route went close under the mountains and was, for the Gobi Desert, comparatively good. From it I used to be able to look out in a southerly direction over the kind of country that Mr. Lattimore must have traversed. Therefore I can realize full well the tremendous difficulties that he must have encountered. My part of the road was desert enough, but the other part is more so. It is most gratifying that a man should have been able not only to have gone through those physical hardships, but to have had the tact and intelligence to get along witht he people at a time when brigandage was so rife. Of course, the reason why Mr. Lattimore could not travel along that comparatively good road which I had the good fortune to be able to follow was on account of the brigandage, and he was forced down into the worst road. Even there there must have been great risk of brigandage, and we must remember that in these times China is in an altogether upset condition. The authority of the Empress Dowager does not run as it did in my time ; there is not the same attention to the central authority that there used to be, and there is a great deal of brigandage. It therefore required much tact and intelligence for a traveller to get through as Mr. Lattimore did.

I should like to join the lecturer in his tribute to the wonderful caravan men who cross the Gobi Desert. They are certainly a marvellous race. I went with a small caravan and had one Chinese camel-man and a Mongol assistant, together with my own Chinese servant, and the latter seemed somehow to do what Mr. Lattimore said—he seemed to feel his way along. He would moon along at night, half doubled up and half asleep, but somehow or other at about one or two o'clock in the morning he would wake up at exactly the right spot where there was something in the nature of a well. The traveller would not recognize it as a well, but that little Chinaman would be able to tap water from the place somehow or other. They are a very hardy race, subject to great hardships and the risk of brigandage. They do somehow stick to one. I went across the country by myself and Mr. Lattimore did the same. We were both entirely in the hands of our men. It would have been very easy for them to dispose of us and nothing more would have been heard: it could have been supposed we had been run through by brigands. But they were faithful to us and saw us through.

If I might have the map put on the screen I would like to show exactly where my route differed from Mr. Lattimore's and explain what was the object of my journey. Well, it was a military object. I started off from Peking in 1887 at the time when the Russians were pressing pretty hard upon the Russian frontier, and Colonel Bell, the head of the Intelligence Department in India, had gone through the settled part of China to see how far the Chinese would be able to support Chinese Turkistan, in the event of invasion of that country by the Russians.

Chinese Turkistan touches India. The Russians had come down to Kuldja. They were pressing down towards India, and the question was whether the Chinese from China would be able to reinforce Chinese Turkistan and keep the Russians off. Colonel Bell, starting from Peking, went by the old road through the settled parts of China—the more important militarily—to see how Chinese Turkistan could be supported. I asked if I might go with him, but he said it would be waste of energy for two officers to go by the same route and advised me to try the Desert road, less important militarily, to see if there was any possible means by which Chinese military forces might get across the Desert into Chinese Turkistan. He said we would meet at Hami at a certain time at the end of the desert journey. I remember the members of the Legation saying that he probably would not wait for me more than a couple of days. I arrived ten days late, and when I got into India Colonel Bell told me he had waited at Hami a whole morning, and as I did not arrive he went on in the afternoon.

As to my route, I followed for a certain way what is apparently called the Small Road and then took the Great Road. I remember celebrating Queen Victoria's first Jubilee on the way, and my twenty-fourth birthday a week later. The route makes a détour in order, as Mr. Lattimore has explained, to get under the Altai Mountains, and we followed, as he has quite accurately described, along the base of the mountains, so that where the ravines came down we should be able to get just a little water. Sometimes there was a trickle of water; generally we had to dig for it. At any rate, we did not go more than a couple of days without getting water of some kind, and we used to take a camel-load with us. My route eventually left the caravan route which goes to Suchow, and I turned south, and had a most wonderful view of those beautiful Tien Shan Mountains—the Heavenly Mountains—standing right up in the sky.

But after that I had the very worst part to traverse because we descended into the lowest portion of what is known as the Desert of Dzungaria, lower than the rest and absolutely barren. I had 70 miles at the march, starting at 11 o'clock in the morning, resting for about three hours in the night, and getting into camp at 3 o'clock the next afternoon. That camp was at a place I was able to identify with Mr. Lattimore; it was on the map I made on the spot. When I was there it was park-like country with trees and a certain amount of water, but no habitation. I understand from Mr. Lattimore that there is now habitation there, and a fort somewhere near. You will realize that this is really not what may be called the permanent route between China and Turkistan. On account of the brigandage caravans have been forced down into the route Mr. Lattimore travelled, hitherto unknown to us. The other will always be the main line from China to Turkistan because it runs along the outlying spurs of the Altai Mountains. It is all the way through burning desert, but not so bad as the lower route. In conclusion, I should like to congratulate Mr. Lattimore on his very remarkable journey, and also Mrs. Lattimore for having the courage and enterprise to go and meet him.

Lord RONALDSHAY: The only part of the country described by Mr. Lattimore this evening of which I can speak from personal knowledge is on the Tien Shan

Mountains in the neighbourhood of Kuldja, a little Chinese town within easy access of that great coach road long ago established by the Russians which, starting at Tashkent in Western Central Asia, carried one for 1000 miles to the frontier of Siberia in an easterly direction and, turning north, went on about 450 miles to Barnaul to the south of the Trans-Siberian Railway. It is about twenty-five years since I travelled along that road from Tashkent, and some parts, at any rate, of the old posting road are now covered by railway. When I travelled over it, unless one was a Russian official, driving was a very slow and leisurely process. I remember a gentleman in an official position in Siberia telling me that he had once driven 1000 versts, approximately 660 miles, along one of these roads in forty-eight hours. I thought then, and still think, that he was romancing. My own experience was very different. Driving day and night, whenever that was possible, it took me thirteen days and two hours to cover the 808 miles from Tashkent to Kuldja, with a couple of Russian *tarantass*, the springless carriage which one uses in those parts. Arrived at Kuldja, I then travelled south in the Tien Shan Mountains, and in the valleys saw some of the nomadic life of Kurds and Kalmuks of which Mr. Lattimore has spoken. I also noticed that the Kalmuks whom I took shooting with me invariably broke an animal's bones, and I imagined that was only to obtain the marrow which they swallowed with satisfaction; but, unlike Mr. Lattimore, I unfortunately could not talk their language, and so did not realize they broke the bones to render the animals innocuous after death. The home-life of the Kurds and Kalmuks was simple but pleasant. I frequently had occasion to spend a night in their hemispherical tents, and found their beds extremely comfortable. I remember being entertained by the headman of one of these Kurd settlements, with herds amounting to some 4000 animals. He regaled me with *kumiss* and a sort of liqueur made from the mare's milk by a primitive process of distillation. The Kurdish women, though the Kurds are Muhammadans, did not cover their faces in the presence of a stranger and were jolly and hospitable.

May I conclude these very brief remarks by expressing to Mr. Lattimore the sense of pleasure which I have derived from listening to his most interesting account of this fascinating part of the world and from seeing the delightful photographs by whose aid he brought that country so graphically before us?

The PRESIDENT: We have listened to Mr. Lattimore's lecture with the greatest interest. We have learnt much about a new route through Southern Mongolia which has never previously been described and about the caravan people with whom he travelled. I was delighted to hear what he said about the Chinese Wall. There has been for some years a sort of agitation against fortification, and as an engineer officer I feel the whole agitation is factitious. It is engineered, if I may use that term, by a lot of young Staff College officers. The Chinese Wall is an example of a very successful wall, or fortification, of the very worst type possible from their point of view. We ourselves have the Antonine wall, and Hadrian's wall, and the Romans were not exactly fools in the military art. Coming to more recent times, we have the Hindenburg line. I am delighted to hear Mr. Lattimore reinforce opinions which I have always held in regard to fortification. The Chinese Wall was a big thing; it affected nations; the Antonine wall and Hadrian's wall affected nations too, just as fortification in future will affect nations if only we have intelligence to study it. However, that is a little beside the mark.

We are all delighted to have had this opportunity to learn something more about Mongolia. We thank Mr. Lattimore very much for his lecture and congratulate him on his lecture and on his journey, and Mrs. Lattimore on hers.

FROM THE TIEN SHAN TO THE ALTAI

LIEUT.-COL. R. C. F. SCHOMBERG

THE country between the Tien Shan and the Altai has not been much visited, and an account of a journey through this region, made this spring, may be of interest. The country between these two mountain ranges is not attractive. It comprises desert and salt lakes, with few habitable places and many arid uninviting hills. In some degree there is a resemblance between it and the Tarim basin, south of the Tien Shan. As the great rivers of Southern Sinkiang roll down from the highlands to find a grave in the dismal sands of the Takla Makan, to the benefit of no one, so the streams from the northern slopes of the same mountains bury themselves in the desert or fill some useless marsh or salt lake.

Several days of unusual rain had delayed the start, and it was not possible to leave Manass till April 29, when we bade farewell to the kind Dutch priest in charge of the Catholic mission there. The orchards were in blossom, and spring had driven away all traces of the dismal Dzungarian winter. The weather was now good, and for several days the heights of the Tien Shan were visible. Some features of the area traversed are indicated upon the map on p. 503, illustrating Mr. Lattimore's paper, to the north-west and north of Urumchi.

The early stages of the route were along the right bank of the Manass River. The track lay over a scrub-covered plain capable of cultivation, and in places efforts at irrigation had been made. Below on the left, at the foot of clay cliffs 20 to 60 feet high, rolled the sluggish muddy stream. The snows had not yet melted, so that the river was low. The number of backwaters showed that the Manass river was not faithful to one bed. One looked over great areas full of toghraks (desert poplar), tall impenetrable reed, much tall grass, with glimpses of water full of duck and geese. The vegetation near the river itself was inconsiderable compared with that of the backwaters, which presented, with their dense mass of trees and vegetation, a contrast to the surrounding country.

At Da-Kuai ("Big Bend") the river was crossed, and on both sides as well as towards the north-east, the direction of its flow, there were extensive swamps. The river here had, apparently, begun to find a new channel. Thirty miles farther on is the halting-place of Tang-Chou-Tsu (The Canal of the Tang Dynasty). This was a miserable place, hot, shadeless, insect-ridden, but of much interest. It was by the side of the Telli Nor, the real end of the river. The people here said that the lake was steadily drying up, and that ten years ago there had been more water. One old man said he remembered when the whole lake had been full. In May 1928 the Telli Nor was dry and I rode over it. The marks on the lake-side enabled an estimate of the different levels to be made.

Although the Telli Nor may be drying up, the Manass river certainly is not. Apparently in early May the volume of water was not enough to reach the lake, because part of the water was swallowed by the old swamp on the way, and the rest was diverted into the marshes where the Manass was endeavouring

to make a new course. When the river should rise, the lake would receive part of the water, but never the whole. Consequently in time the Telli Nor will be wholly dry, and a new basin will be formed to receive the end of the new channel of the river. Before Dakuai, at Taipingliang (the abode of great calm) the river was about to cut a chord across a wide curve where sandhills blocked its farther trend, in an easterly direction.

The Canal of the Tang dynasty was a solid piece of earthwork along the east side of the Telli Nor. At the north-east extremity of the lake, where the canal ended, there was a good growth of reeds and poplars. The canal was hopelessly out of repair. Before Dakuai many abandoned canals had been passed, as well as deserted houses, empty fields, and other signs of former cultivation. It seems that some years ago the dam that kept up the irrigation water burst. The cultivators all left, as they could not repair it. The only men able to do the work lived some way off, and could only spare the few weeks between the end of their harvest and the beginning of winter to mend the earthwork. It was said that in 1928 this dam would be repaired, so that a large area should again be under crops in 1929.

At the Telli Nor I left the Manass river. I was told there was a petrol spring to the west of the lake, in a low inhospitable range of hills.

An arid bleak stretch, with desolate hills and black gravelly "sai" glistening in the heat, was crossed before reaching the next water, at the Orchu or Urhu river, 28 miles to the north. Here was the oasis of Urumuhu. The undulating plain, fretted with small jagged hills, suddenly broke. The track abruptly descended 80 feet down a soft clay bank. Looking down into the rift, one saw a valley some 5 miles wide filled with toghrak trees. The leaves were just out, and a belt of delicate emerald filled the gash in the barren plain. The river, hidden by the trees, known locally as the Urumuhu river, flows from the Urkashar hills. Usually it is an insignificant stream, but it happened to be in spate and was crossed with difficulty. The oasis was populated by Torgut Mongols, of disagreeable habits, and there were a few Chinese farmers. The oasis could undoubtedly be developed. The soil is good, and the water ample. The climate is warm, and snow never lies. In May the temperature under the trees reached as much as 100° F. The river flows into the Airik Nor. After widening and passing through much swamp, full of toghraks and reed, the river narrowed about 7 miles from the lake, and was confined by barren hills. The Airik Nor, which lies north-east to south-west and is a long narrow sheet of water, was fringed with vegetation on the oasis side, but barren with arid hills on the far side.

Crossing a desolate dreary stretch, it was pleasant to reach, after 25 miles, the Kobuk river. Flowing from the Saur Mountains, this river watered a large area. There was some cultivation and fair grazing, besides a small bazaar for the farmers and travellers. The waterless region had now been left, and the southern slopes of the Kara Adyr and northern sides of the Salburty range were watered by small streams. Between them was a wide open grassy plain, on which many nomads, chiefly Torguts but a few Kasaks, pastured their flocks.

Though the height was not great, it was bitterly cold crossing the Kara Adyr. In one of the most depressing places, by a small spring, an enterprising

Chinaman had opened "The Inn of Heavenly Fortune." He certainly deserved such. A long 25 miles, over a sloping plain which grew less and less grassy as it descended, finished at the Uliungur Nor. There was a small spring close to the lake, which was here a backwater or stagnant expanse of evil-smelling water, with black sludge and reeds. The water of the lake itself was slightly brackish, but quite drinkable. Opposite, just discernible, was Buluntokhoi, where the Chinese kept a garrison. It is a great name, but not much else. Its chief importance is as a rendezvous for caravans. The lake was a bright green colour, with violet and purple shadows. Its waters were clear, and the duck, teal, and geese, besides a party of swans, dived and floated undisturbed. There were traces of gold-workings by the shore, towards the north-west end. There was a fair growth of reed and grass near the edge. The chief feeder of the lake is the Urungu river, but it must receive much water from the drainage on the eastern slopes of the Saur Mountains.

Since leaving Manass four areas, without a visible drainage exteriority, had been passed, the Manass, Urumuhu, Kobuk, and Urungu river ends. Near the Uliungur Nor the topography is strange. The black Irtish and the Urungu rivers rise in the same range, the Altai. The waters of the former find their way through Siberia to the Arctic Ocean. The Urungu discharges itself into the Uliungur lake, the northern shores of which are but 4 miles from the Irtish. Leaving the shores of this lake, the ground rises steadily, and a range of low hills effectively separates the lake from the Irtish river.

The latter was a whirling flood of black water. Its left bank was bounded by high sandhills, but its right bank had failed to hold the swollen river, and the country was inundated by the flood water. Presumably as the snow-level of the Altai was so much lower than that of the Tien Shan, the snow-water, in spite of difference in latitude, came six weeks earlier. Thus the Irtish was in flood when the Manass was as yet unmoved.

There was a good rope ferry over the river, but although there was some traffic—for the caravans from Ku-Cheng come in here—yet there was no accommodation for man or beast, and no supplies either. This caravan route avoids Urumchi and Manass and other tax-collecting places. Ku Cheng is now the distributing centre in the province for all goods from China, and this direct route is convenient, though in summer the water difficulties were said to be considerable. North of the Irtish the country was flooded and progress difficult. The horses disappeared completely in what seemed ordinary ditches. The Kran river was almost as formidable a stream as the Irtish, and had likewise overflowed its banks.

From now onward many Kasaks, all of the Kirei tribe, were met as they migrated to the mountains. The southern slopes of the Altai mountains were crowded with nomads. Under present political conditions nobody is allowed to cross into Outer Mongolia. The western valleys held Kirei, the eastern Torguts, though in some places in the west there were Uriankhai Mongols.

The capital of the Altai region was a small prosperous town of some 2000 inhabitants. There was an extremely uncivil Taotai, and the usual officials. The town was embellished by the presence of a Bolshevist consul who lived in a bazaar house. The shops were good, the bazaar well stocked, and the price of everything was exorbitant. Though colloquially known as Altai, the

Chinese call the town Cheng-Hua-Ssu (the blooming or blossoming flower) To the Kasaks and Mongols it is known as Sharasume.

The Kran river, a fine rushing stream, flows in three branches below the town, and is crossed by good bridges. The climate was delightful, fresh and invigorating, with bright sun and cold nights. The winter was said to be severe, and the fuel difficulty great. There was much gold-mining done in the warm months, and the population was increased considerably, and not by at all a desirable class of immigrant.

After leaving Sharasume, the journey, by no means under official auspices, was resumed towards the western valleys of the Altai, the Kaba, and Burchun valleys. It was necessary, less for geographical than for political reasons, to return to the Irtish river at its junction with the Burchun. In former times steamers from the Siberian side of the frontier came here. The houses were all in the Russian style, and the local mandarin occupied a particularly fine one, though neglect and other causes were rapidly ruining it. The Irtish here was crossed by a good ferry. It was a fine river, reinforced by the Kran.

The Burchun river was a surprise. It was as wide as the Irtish, and was a roaring uncontrollable mass of water. A ferry, worked by two Kasak women and a small boy, was particularly good. On the farther side, the inundations were so great that a dry place was reached with difficulty. There were four subsidiary rivers to cross, and the water was over the horses' backs. It was only the absence of current that made the crossing at all possible. The flood increased and in a short while it was not possible to reach the ferry—nor the bazaar. Kasaks, stark naked, struggled to swim their horses as far as the ferry, but they had to give up the attempt.

From here it took three days to reach the Altai Mountains. The scenery could not be called fine. There was, though, a freshness about the hills that contrasted agreeably with the plains. The snow had nearly all melted. What the landscape needed was one conspicuous peak, one snow giant to dominate the mountains and to give dignity to them. But the sun-lit glens, full of poplar, birch, and willow, and aglow with flowers, the grassy sides and clear streams, were an unending delight. Everywhere there were flocks. The pastures were a mass of sheep and goats, whilst the Aouls, the felt tents of the Kirei, stood by the dozen on any suitable site. These Kasaks were migrating to the upper pastures, and the narrow paths were choked with their animals.

Leaving the Burchun, the track led to the Kaba river, which is for some way the boundary between Russia and China. There are here two branches, the "White" and "Black" Kaba respectively. The former is the frontier in some places. The Black Kaba flows in from Russian territory, and the two streams united form the Kaba river, which flows into the Irtish.

From the small frontier post on the Ak-Kaba a track led over the watershed into the valley of the Burchun. The forests of larch stretched down into deep grassy meadows, covered with flowers. The big purple gentian, the small blue one, cyclamens, anemones, and other flowers were in profusion. The violas grew in huge masses, purple, violet, cream, and yellow, and made patches of colour in the turf. A "Christmas rose," the size of a single dahlia, and a deep magenta, was everywhere, a noble plant, in some cases over 2 feet high.

Descending into the Upper Burchun valley, we entered a wide plain extending for several miles, green and level, an ideal pasture. The valley, save for a small police post and four or five Uriankhai Kalmuck tents, was empty. Just above this plain the Kanaz lake filled the valley. It should be noted that the valley and river are both called Kanaz in their upper part. The lake itself was an ideal Scottish loch, a long piece of clear water. The western shores were steep and rocky, the eastern were green and wooded, and rose gently up the valley's side. The narrow end of the lake is in the insignificant main Altai range, on which there was some snow, though fast melting. The absence of animal life in the whole of the Altai was noticeable. The ovis ammon and the wapiti, the roedeer and the ibex, had all been killed off. It was sad to see this ideal ground denuded of its fauna. There were said to be a few bears, but the sables had vanished. This was not remarkable, as the price of a sable was £11, and this for the inferior Chinese variety.

The Uriankhai Kalmucks come down in the winter to these levels, and there were low log huts in several places, which were then occupied. Although not too hot for the Kasaks, the Kalmucks fled to higher pastures in the summer. The Kirei and Uriankhai pastures were kept strictly apart. No trespassing was allowed.

The pleasantest feature of the journey was meeting the Kirei. These Kasaks consider themselves the *élite* of their race, and no more agreeable people could be found. They were courteous, hospitable, and intelligent. They made the foreigner welcome, though he must often have been a nuisance. They were quite unspoiled, and long may they remain so.

The distances travelled were as follows:

Manass to Sharasume	349 miles.
Sharasume to Burchun	63 „
Burchun to Kanaz Lake *viâ* Ak-Kaba Post	110 „

For the first stage of the journey, as far as M. 255, there is a telegraph line and also a postal route. Hardly any travellers were met on the way.

With regard to maps, it may be noted that War Office Map 1/4,000,000, Central Asia, Sheet 21, gives Tulta as another name for Sharasume. This is incorrect. Tulta is the next valley, just at the C of "Cheng." Sharasume itself should be on the Kran River and not to the east of it.

Stieler's Atlas (Map No. 62) only gives Tulta, and this in the wrong place. The Kobuk river of the War Office map above quoted should be spelt Khobuk, the kh being guttural. This river is spelt Chobuk by Stieler. The Russian "40-verst" map, 1910, agrees with the War Office in calling the river Kobuk, and with Stieler in putting Tulta in the wrong place, and assigning this name to the site of Sharasume.

BOUVET ISLAND

WE have received from Consul Bjarne Aagaard of Fredriksvern, Norway, a pamphlet dated 3 April 1928 entitled 'The *Norvegia* Expedition and Bouvet Island,' which begins thus:

> On 1st December 1927 Bouvet Island, situated in lat. 54° 26′ S. and long. 3° 24′ E., was annexed by Norway, Captain Harald Horntvedt, master of the *Norvegia* equipped by Consul Lars Christensen of Sandefjord, Norway, having on that date hoisted the Norwegian flag on shore and taken formal possession of the island in accordance with authority given by the Norwegian Government on the 31st August 1927.

The object of the expedition is said to have been partly commercial and partly scientific: its political part is not here mentioned. It was to land on Bouvet Island, search for the Lindsay Island reported in 1808 and the Liverpool and Thompson Islands discovered by Captain Norris of the *Sprightly* in 1825; to proceed to Enderby Land and Kemp Land, follow the edge of the ice westward, and work through the Weddell Sea to South Shetland or South Georgia. The *Norvegia* carried Messrs. H. Mosby and D. Rustad as scientific staff, while Professor Holtedahl and Dr. Olstad were sent out to join her at South Georgia. The ship called at Capetown on her voyage out from Norway, and left Capetown on November 19. She made her first landing on Bouvet Island on December 1, and struck a rock of Cape Valdivia on December 3, which tore off some of the ice-sheathing and damaged the keel. She stayed about a month in the neighbourhood of the island, catching one or more whales and taking 800 hair seals on the south-west point. It was then decided that the damage forbade any attempt to search for other islands of the group or to visit Enderby Land. She proceeded to South Georgia, where the damage was found too extensive to repair without material from home; and there at the date of the pamphlet she was lying disabled.

Meanwhile the Colonial Office had authorized Reuter's Agency to announce on January 17 that the British Government had granted a sole concession to a Norwegian firm, Messrs. Johan Rasmussen & Co., to catch whales within the territorial waters of Bouvet and Thompson Islands and to export guano from them. When this news was received in Oslo the Norwegian Minister in London was instructed to represent that the *Norvegia* had taken possession of Bouvet Island on 1 December 1927. The Foreign Office replied that Bouvet Island had been formally occupied by Great Britain in 1825 and that this occupation was still in force. In the House of Commons on February 20 the Foreign Secretary stated that Thompson Island had been discovered by Captain Norris in 1825 and sighted by Captain Fuller, an American seaman, in 1893. There seemed no ground for questioning its existence, though there was some degree of uncertainty in its position. The British Government had therefore informed the Norwegian Government that they considered the title acquired by virtue of the occupation of Bouvet Island by Captain Norris in 1825 to be valid, and that they must formally reserve all their rights in connection with this island.

This is a brief summary of the position stated by Consul Aagaard, who then gives a very interesting history of the course of discovery in these seas from

the day when Captain Francois Lozier-Bouvet sailed from Lorient on 19 July 1738 to search for the land reported by De Gonneville in 1503 and for Quiros' Austrialia del Espiritu Santo.

From this and from the similar and in some respects even fuller summary given by Captain Sachse in his "Wiederauffinden der Bouvet-Insel durch die deutsche Tiefsee Expedition" (Wissenschaftl. Ergebnisse deutschen Tiefsee-Expedition auf dem Dampfer *Valdivia*, 1898–1899 10. Bd., 1. Lief.: Jena: Verlag von Fischer, 1905), we can gain a fairly complete history of the complicated course of discovery and failure to find again, which makes the story so perplexing. Briefly it is this:

In 1739 Bouvet sighted land which he called Cap de la Circoncision in 54° S. lat. and between 27° and 28° E. of Teneriffe, and estimated the extent of the land he saw to be 45 miles from north to south. He proceeded south to 54° 40′, where he got into pack ice, and on January 6 sighted land in a position unspecified, but presumably south of the first. On January 8 he thought he saw land north-north-east of the cape, but later speaks of it as land-sky.

On both his first and second voyages Captain James Cook searched for this land without success, and showed that it could not be in the longitude assigned to it. Captain Furneaux independently after parting from Cook made a similar unsuccessful search.

In 1808 Captain James Lindsay, commanding a vessel belonging to the Enderby brothers, sighted an island in 54° 22′ S. and 4° 15′ E. of Greenwich (or 3° 15′ E. according to Ross). The island appeared to be about 5 miles from east to west. The west point was high and steep, the east point low and level. He was unable to land.

In 1822 Captain Benjamin Morrell, an American sealer, found an island in 54° 15′ S. and long. 6° 11′ E., which he called "Bouvettes Island," "from being first seen by that navigator in October 1808": an evident confusion between the accounts of Bouvet and Lindsay. He sent his second mate ashore and obtained seal-skins of excellent quality. His boats twice circumnavigated the island, but found only one possible landing-place.

In 1825 Captain Norris, of the sealer *Sprightly*, in company with another vessel of Messrs. Enderby's fleet, *The Lively*, found two islands, one in 54° 15′ S. and longitude 5° and one in 53° 56′ S. and 5° 30′ E., which they named respectively Liverpool and Thompson Island. Norris landed upon Liverpool Island and formally took possession of it for the British Crown. He did not land on Thompson Island to the north-east. Extracts from Norris's log and a summary of that log with sketches which was handed by Messrs. Enderby to the Admiralty have been discussed exhaustively, but not very conclusively. Captain Sachse considered that Liverpool Island is what we now called Bouvet Island, while Consul Aagaard admits the probability of it, but considers that there is no certain proof. We shall discuss this in detail later.

In 1843 Captain James Clark Ross searched unsuccessfully for Bouvet and Lindsay Islands, but did not know until after his return of the enterprise of Messrs. Enderby and Captain Norris.

In 1845 Lieutenant T. E. L. Moore, R.N., was sent in the sealer *Pagoda*

with instructions to search for the land reported by Bouvet, Lindsay, and Norris, but had no success.

In 1878 Captain Williams, of the American schooner *Golden West*, is said to have landed on one or the other island. Captain Church, of the *Delia Church*, sighted one in 1882, and Captain Fuller in 1893 is said to have seen both islands.

These facts are recorded by Mr. Edwin Swift Balch in a paper "Antarctica Addenda" in the *Journal* of the Franklin Institute for February 1904, vol. 157, No. 2, p. 82. Since Consul Aagaard says that he has not been able to consult the original publication, and since also he has been misled by a misprint in the 'African Pilot,' Part II, p. 353, of the edition of 1922, where Captain Fuller is called Captain Allen, though on the next page the name is given correctly, it seems desirable to print the following extract from Mr. Balch's paper.

Captain Joseph J. Fuller, of New London, now lighthouse keeper at Stonington, served in the United States navy during the Civil War, and afterwards went repeatedly sealing and sea elephant hunting in the Antarctic . . . in 1893, in the *Francis Allen* he saw Bouvet Island, which he also calls Circumcision. It is high and rugged in the north, high and covered with snow in the middle, and it slopes down to the sea in the south-west. Captain Fuller's observations place it in 52″ 55′ south latitude, 4° 10′ east Longitude. He saw Thompson Island bearing about north-east from Bouvet Island, but he could not land on either, on account of ice, wind and fog. . . . Captain Fuller states that Captain John Williams (now deceased), master of the schooner *Golden West*, of New London, landed on Bouvet Island about 1878. He could not find anchorage, and it was necessary to go ashore in boats; there were no sand beaches, only rocky beaches, on which five hundred fur seal were taken. Captain Rastus Church, of New London, in the *Delia Church*, in 1882 also sighted Bouvet Island, but did not land.

In 1898 a German deep-sea expedition on the Hamburg-Amerika liner *Valdivia* searched for Thompson and Liverpool Islands in the positions assigned to them without success. She failed likewise to find Lindsay Island, but on November 25 found an island whose middle point was determined to be lat. 54° 26′ 4″ S. and long. 3° 24′ 2″ E., which she named Bouvet Island in honour of the first discoverer of land in these regions. Considering it probable that Bouvet Island was identical with Liverpool Island, the *Valdivia* made a prolonged but unsuccessful search for the other island in the position assigned to it by Norris.

In 1916 the United States magnetic survey ship *Carnegie* sighted an island which they referred to as Lindsay Island, whose position agrees very closely with the *Valdivia's* Bouvet Island, but did not land and did not see Thompson Island.

In 1926 the German ship *Meteor* visited Bouvet Island but was unable to land. She searched unsuccessfully for Thompson Island.

Finally, on 1 December 1927, Captain Horntvedt, of the *Norvegia*, landed on Bouvet Island, and under instructions from the Norwegian Government claimed it for that country.

In his pamphlet Consul Aagaard contends that there is no clear proof that Liverpool Island is identical with Bouvet Island, and asks for the publication of the original log kept by Captain Norris, which is supposed by him to be in

possession of the Admiralty. This mistake is founded upon the two passages in Ross's book and one in Captain Sachse's account. Captain Ross writes as follows:

Voyage in the Antarctic Regions, Vol. II, page 371

The log-book of the Sprightly, Captain Norris, is now before me, from which I quote the following passages: "10th December, 1825. The island is in latitude 54° 15′ S., longitude by chronometer 5° E.; and, as we are now certain it is an island, we name it Liverpool Island. It appears to extend three or four leagues from north to south; the north end high and rugged, the south end low, the middle high and covered with snow."

There is a pencil drawing of the island, bearing west five or six leagues. The log says, "The captain got within a cable length of the shore, but owing to the steepness of the rocks, and the weather coming on thick, with much sleet and snow, was the whole and sole reason of not making a successful landing."

On the 13th they met with another island, of which is said, "This island, which we have named Thompson Island, bears about N.N.E., fifteen leagues from Liverpool Island; there are also three rocks, which we named the Chimnies, to the S.W., four or five miles from Thompson Island; and another rock three miles to the southward of them. The island is in latitude 53° 56′ S., longitude 5° 30′ E."

We read, "16th December, p.m., fresh breezes and cloudy. The *Lively* (the consort of the *Sprightly*), by order, hoisted out her boat, and we manned her out of both vessels and sent her on shore, to endeavour to find a landing at the west end of the island. We sounded on its south side, and found from thirty-five to twenty fathoms, black sandy bottom, at a mile from the shore. Caught a number of small fish, resembling codfish. At 8 p.m. the boat returned, having hoisted the union jack on the shore, etc.

"On the 18th p.m., the captain gave orders for a boat to be manned from each vessel, one to go one way round the isle and one the other, and to meet at the west end."

Stormy weather almost immediately followed the landing of the boats, and it was not until the 24th the boats could regain the ships. They brought the skins of forty-eight seals they had killed on the island. And the log says, "We found by their report that seals are very scarce; and the isle is not likely to produce many, the S.W. point being the only place where they can make a landing, as the boats went entirely round the isle, and nothing but perpendicular rocks could be seen; it bears evident marks of having been a volcano, as it is nothing less than a complete cinder, with immense veins of lava, which have the appearance of black glass, though some are streaked with white.

Captain Sachse publishes what he calls 'Ein Faksimile der Original-Karte und des Original-Journal Norris' which had been handed to him by the courtesy of the Hydrographic Department of the Admiralty. There have been much confusion and argument owing to this use of the word "facsimile." The only documents now in the possession of the Admiralty, or which can be traced as having ever been in their possession, are:

1. A sheet of extracts from Captain Norris's log communicated by Messrs. Enderby and apparently copied in their office.

2. A sheet of sketches from the log of the *Sprightly* apparently also copied in Messrs. Enderby's office.

The extracts from the log are similar to, but not identical with, those given

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Phot. S. Kemp

Bouvet Island bearing 253° (or from E. b N.), surrounded by pack ice

Telephot. E. H. Marshall

Bouvet Island from the North: Cap de la Circoncision on right

From a water-colour sketch by A. C. Hardy

Bouvet Island from E. b S.

From a water-colour sketch by E. R. Gunther

Bouvet Island from E.N.E.

by Ross, and it seems certain that Ross must have had the original log before him, but that the log was not in the possession of the Admiralty. The so-called facsimile of the log, that is to say the extracts from it communicated by Messrs. Enderby to the Admiralty and by the Admiralty to Captain Sachse, are translated into German by Sachse and retranslated into English by Consul Aagaard. It is therefore desirable that they should be printed from the documents in the possession of the Admiralty, and with the permission of the Board of Admiralty we print here a careful copy of the sheet of extracts from the log and a reproduction of the sheet of sketches. This is the whole material now in the possession of the Admiralty. It bears the Hydrographic Department stamp "original": but that means only that so far as Admiralty records are concerned, this is the original document, though endorsed as a copy. The original log presumably used by Ross is not, so far as is known, any longer in existence, and the "facsimile communicated to Sachse" is not more than a sheet of extracts: extracts which merit the judgment pronounced on them by Consul Aagaard that they seem to have been made by an unskilled person. We need not fully agree with Consul Aagaard in his conclusion that "if this document was the only proof of Norris having landed on Liverpool Island, the proof would not be sufficient."

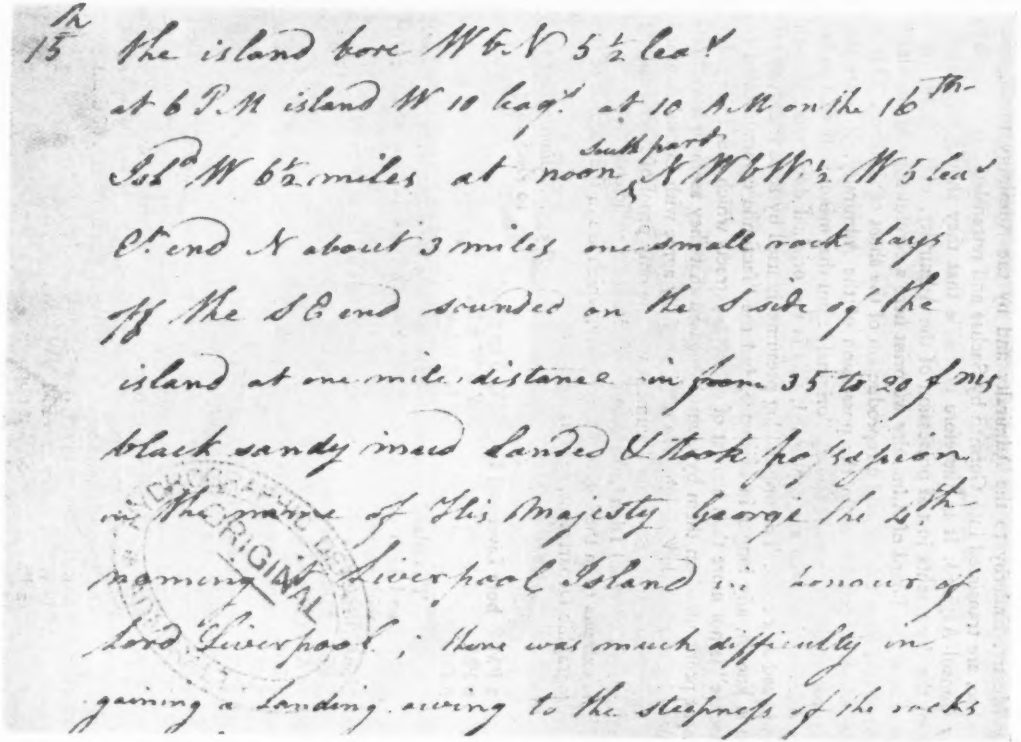
The extracts from the log of the *Sprightly*, which are in the records of the Hydrographic Department, read as follows:

E 553. *Atlantic folio* 1.
10 Dec^{r} 1825

2 PM bore Liverpool I$^{d.}$ SSW 6 to 7 lea$^{s.}$
6 PM " " SW b W 5 lea$^{s.}$
8 D^{o} " " W b S 6 lea$^{s.}$

The island appeared to extend 3 or 4 lea^{s} from N. to S. North end high and rugged, S end low, the middle high and covered with snow

11th Noon S.E. part the I^{d} W b S ½ S 3 lea$^{s.}$ part of the I^{d} bore W
8 PM Middle of the I^{d} bore W b N 6½ miles
12th 10 AM E$^{t.}$ end bore W b N
5 PM " " NW b W } sleet
8 d^{o} " " WNW
13th 2 PM saw a small low I^{d} bear^{g} W. 6 miles
10 d^{o} 3 rocks in a cluster bear^{g} NW
12 d^{o} another rock NW nearly level with the water's edge. This island is in Lat$^{d.}$ 53.56 Long 5° 30′ this island which we have named Thompsons I^{d} bears NNE 15 lea$^{s.}$ from Liverpool island the 3 rocks we named the Chimnies SE 4 or 5 miles off Thompsons I^{d} and another small rock 3 miles south of them
14th At 1 PM saw the Island bear^{g} W b S 5 lea$^{s.}$
at 4 PM I^{d} WNW hazey at 6 PM NW b W
6 lea^{s} at 12 PM it bore NW at noon
15th the island bore W b N 5½ lea$^{s.}$
at 6 PM island W 10 lea$^{s.}$ at 10 AM on the 16th Isl^{d} W 6½ miles at noon south part NWbW½W 5 lea$^{s.}$ E$^{t.}$ end N about 3 miles one small rock lays off the S.E. end sounded on the S. side of the island at one mile distance in from 35 to 20 fms. black sandy mud Landed and took possession in the name of His Majesty George the 4th naming it Liverpool Island in honour of Lord Liverpool; there was much difficulty in gaining



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gaining a landing owing to the steepness of the rocks

A portion of the copy of Captain Norris' Log of the "Sprightly" preserved in the Hydrographic Department

a landing owing to the steepness of the rocks and the surf which broke over them. SW point is the only place to land at the boat went entirely round the Isle and found nothing but perpendicular rocks could be seen; this Isl[d]. bears evident marks of its having been a volcano as it is nothing less than a complete cinder, with immense ravines of lava which has the appearance of a black glass though some is streaked with white

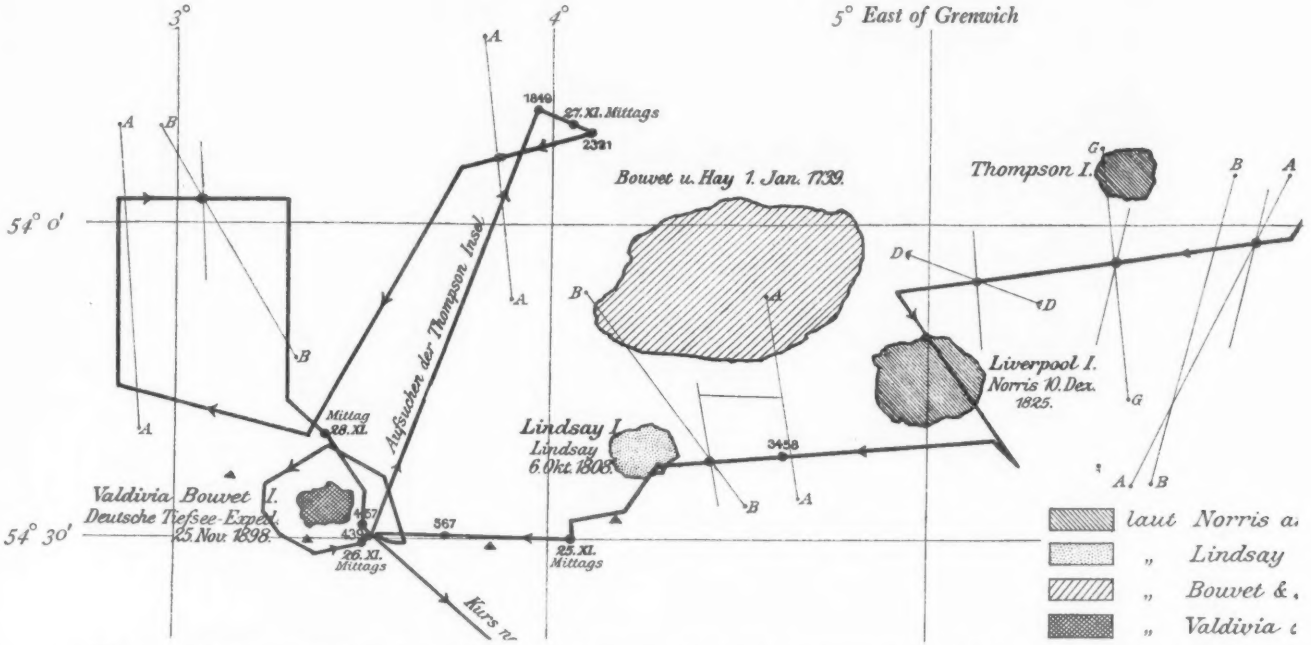
Copied from the Log of the Smak Sprightly
GEORGE NORRIS, Master in Nov[r] and Dec[r] 1825
Communicated by Mess[rs]. Enderby in Nov[r]. 1826

It will be seen on comparing Consul Aagaard's retranslation into English of Captain Sachse's translation into German that there is little difference in sense, and that though it is possible to argue from Ross's account that Norris landed on Thompson Island rather than on Liverpool Island, yet the extracts from the log of the *Sprightly* preserved by the Admiralty make it quite clear that it was on Liverpool Island that Norris landed and hoisted the British flag. The only question which remains, then, is whether one can show definitely that Liverpool Island of Norris is the same as Bouvet Island of the *Valdivia*. There is a discordance of about ten minutes of latitude and of rather more than a degree and a half in longitude. Neither is greater than might be expected in the positions obtained by whalers more than a century ago. Happily there are the sketches made by Norris which can be compared with the photographs of Bouvet Island, and perhaps better still with the sketches of Bouvet Island made by two members of the scientific staff of the R.R.S. *Discovery*.

By permission of the Board of Admiralty we reproduce the copies of Captain Norris' sketches somewhat reduced in scale. The sketches have the same defects as the extracts from the log itself, that they are somewhat imperfectly defined. The uppermost sketch is from a position about 5 or 6 leagues east of Liverpool Island. The second from the top is Thompson Island, to which we shall return. The third is imperfectly described, but is evidently from the east or south-east, and shows the south-westerly point at which alone landing is possible. The fourth is entirely undescribed, but is probably also from about south-east. The fifth is taken from the west side, somewhere in the neighbourhood of the anchorage, which Norris found in 17 fathoms. The sketch of the rock bearing north-west by west from Liverpool Island seems to be unique. We have not found any other record of this feature. The seventh sketch adjoining it from about north-north-west seems also to be unique. We cannot find any other sketch or photograph from quite the same position.

In comparing the sketches with the photographs one must remember the tendency of the pencil to exaggerate the vertical in comparison with the horizontal. Unless the most careful measurements are made the slopes will be steepened. This is sufficient to account for a part of the apparent discordance between the steepness of Liverpool Island as sketched in Norris' log and its less accentuated contours recorded in the photographs. The same effect to a less degree is seen in comparing the drawings made by Messrs. Hardy and Gunther with the photographs made by Dr. Kemp and Dr. Marshall. Moreover, a rugged island changes its profile very quickly with change of position and distance, and we can hardly expect to find a close resemblance

A portion of the copy of Captain Norris' Log of the "Sprightly" preserved in the Hydrographic Department



The various positions assigned to Bouvet Island and Thompson Island, with the course of the "Valdivia," from Captain W. Sachse's diagram (loc. cit.). The fine lines marked with double letters are Position Lines

between the various representations, made from positions rather ill-defined. But it is possible to say definitely that there is no serious discrepancy between the sketches of Norris' log and later representations of the island which since the voyage of the *Valdivia* is known as Bouvet Island. And there are two crucial points in which Norris and recent authorities agree precisely. A landing can be effected only at the south-west point; and there is relatively shoal water a mile off the southern shore of the island. Norris says: "S.W. point is the only place to land at the boat went entirely round the Isle and found nothing but perpendicular rocks could be seen." Consul Aagaard summarizes from the account of the *Valdivia* thus: "A running survey of the island was made, but no boats could be sent on shore on account of the high seas met with. . . . The slopes of the cone terminated on all sides in precipitous cliffs of glaciers, descending abruptly to sea-level. The whole of the eastern side was entirely covered with a sheet of ice, which reached the sea as an ice-wall about 400 feet in height. . . . The northern and western sides of the island, which, except for isolated glaciers, were comparatively free from ice, were much steeper than the southern and eastern. At Seal Point, the south-western extremity, the cliffs attained a height of 1200 feet. . . . No harbour was found and the only likely spot where one could land with small boats seemed to be the edge of a glacier near Seal Point, and then only in calm weather." This also was the place, according to the account which Professor Holtedahl gave the British Association at Glasgow, where the *Norvegia* party landed in 1927. So much for the identity of the only landing-place. As for the soundings, Norris says: "Sounded on the S. side of the island at 1 mile distance in from 55 to 20 fathoms black sandy mud." The *Valdivia's* navigating officer says: "Off the south-eastern side of the island the *Valdivia's* dredge brought up grey volcanic mud, containing tuff and basalt. Thirty six and a half to sixty metres were found about a mile off the south coast of the island, 457 metres two miles off, and 439 3½ miles from shore." The agreement of the soundings is striking; in seas which are elsewhere deep Norris and the *Valdivia* find relatively shallow water a mile from the south coast. The former says 20 and 35 fathoms; the latter 17 and 28. With this double confirmation of the argument from the similarity of drawings and photographs, and no single point of clear divergence, we can find no reasonable ground for doubting the identity of Liverpool Island and Bouvet Island.

But it is not so clear that the Cap de la Circoncision which Bouvet saw and named was on the island which is now known as Bouvet. On the contrary, one may very well argue that this cape was the western or north-western extremity of Thompson Island. From the full summary of Bouvet's narrative given by Consul Aagaard we learn that Bouvet made the Cape to be 54° 6′ south, and he estimated the extent of the land which he saw to be 45 miles from north to south. He cruised as far south as 54° 40′, and was continually hampered by ice and fog. One may perhaps best account for the 45 miles by supposing that he sighted both Thompson Island and what we now call Bouvet Island, and was unable to see that they did not form parts of one extensive land. And further, it may very well be that the island Lindsay found was that afterwards found by Norris and called Thompson Island. The position given by Lindsay according to Ross is close to the true position of

Bouvet Island, not a degree farther east as it is otherwise given. But the trouble is that the description also given by Ross, apparently from the log or from Enderby Brothers, does not tally at all well with Bouvet Island. "The west point (which was called Dalrymple Head) was high and steep, whereas the east point was low and level, covered with snow." This is at least more consistent with Norris's "small low island" than with Bouvet Island, which even on the eastern side, which is the less steep, has an ice and rock cliff 400 feet high. The sketch of Thompson I. by Morris was probably from the east (see log). It shows low ground in the foreground and a high peak in the distance. Log and sketch together agree fairly well with Lindsay.

There remains the difficulty that several ships have searched for Thompson Island in the position given for it in the extracts from Norris' log, 15 leagues north-north-east of Liverpool or Bouvet Island, and have been unsuccessful. Is it possible that the figures given by Norris are wrong? A study of the records seems to show that almost anything is possible. The position of Thompson Island, but not of Liverpool Island, is given in the Admiralty transcript of the Norris log, while Ross, claiming to have the original log of the *Sprightly* before him, gives a position for the latter island which is much at variance with the distance and bearing given in both the original and the transcript. Ross says that the outlying islets, the "Chimnies," are south-west, while the transcript says they are south-east of Thompson Island. One cannot therefore be confident that the 15 leagues north-north-east is right, and the track chart of the *Valdivia* suggests that if the bearing were north or a little west, Thompson Island might very well have been out of sight, nearly 20 miles from the nearest point of the track. The *Meteor* searched in the reputed position of Thompson Island without success, but since visibility was only about 10 miles our hypothesis is not thereby refuted. On the contrary, this examination seems to show that the Secretary of State for Foreign Affairs was perfectly well advised when he stated in the House of Commons that in view of Captain Norris's definite statement and the confirmation afforded by Captain Fuller there did not appear to be any ground for questioning the existence of Thompson Island, though there was some degree of uncertainty regarding its position.

Note added 21 November.

The above discussion was written without knowledge of the chapter on "The Auroras and other doubtful Islands" in Lieut.-Commander Gould's recently published book 'Oddities: a Book of unexplained Facts' which reaches the same conclusion, that there is room for Thompson Island in the unexplored sea north of Bouvet Island.

On November 19 it was announced in the House of Commons that His Majesty's Government had decided to waive the British claim to Bouvet Island in favour of Norway, but nothing was said of the status of Thompson Island, which was included in the recent British lease to a Norwegian firm.

MORE LOST OASES OF THE LIBYAN DESERT

DOUGLAS NEWBOLD
SUDAN POLITICAL SERVICE

THE two papers in the September issue of the *Journal* on "Lost Oases of the Libyan Desert," by Dr. John Ball and Mr. Harding King, interested me greatly, partly because in November and December 1927 Mr. W. B. K. Shaw of the Sudan Forestry Service and I made a journey in the South Libyan Desert in search, *inter alia*, of the legendary Oasis of Zerzura, and partly because there are, in addition to the native information obtained by travellers in Egypt, certain Sudanese data about this and other unvisited or unknown water-sources in the desert.

A full account of our journey is appearing in a forthcoming number of *Sudan Notes and Records*.* A description of the archæological finds of this and a previous journey in 1923 to Bir Natrun† has already been published in *Antiquity*.‡ On our journey of 1927 we visited Merga Oasis§ and a previously unknown water-bearing depression 20 miles north-east of Merga. We then cut across the unexplored desert between Merga and Selima, taking a wide curve to the west of the Arbain Road, hoping to find some signs of an oasis, Zerzura or another, in this long stretch of 275 miles. We found nothing. The remotest point reached in the desert was long. 27° 40′, lat. 20° 56′, about 40 miles south-east of where Mr. Harding King originally sited the "Egyptian Oasis," reported five days north of Merga. This journey, coupled with the journey of Prince Kemal el Din Hussein and Dr. Ball in 1925, Terfawi—Owenat—Erdi—Merga—Owenat, has narrowed down the likely positions for Zerzura.

Dr. Ball's discussion of the Zerzura problem (*G.J.*, 70, 1927, 120–6) is comprehensive. His conclusions were:

(*a*) The traditions refer to more than one place.

(*b*) His contour map shows two areas, one northern and one southern, where the water-levels would admit of an oasis lying;

(*c*) It is quite conceivable that at least one oasis may lie within either of them;

(*d*) The southern area is more likely to yield results than the northern.

In his later paper, however, after considering the two MS. which mention Zerzura, he states, "We must conclude that the 'lost' oasis of Zerzura has no more real existence than the philosopher's stone." He qualifies this by saying that there may still be oases hitherto unvisited by Europeans. This is, to my mind, the main problem, viz. the existence or non-existence of "lost" oases.

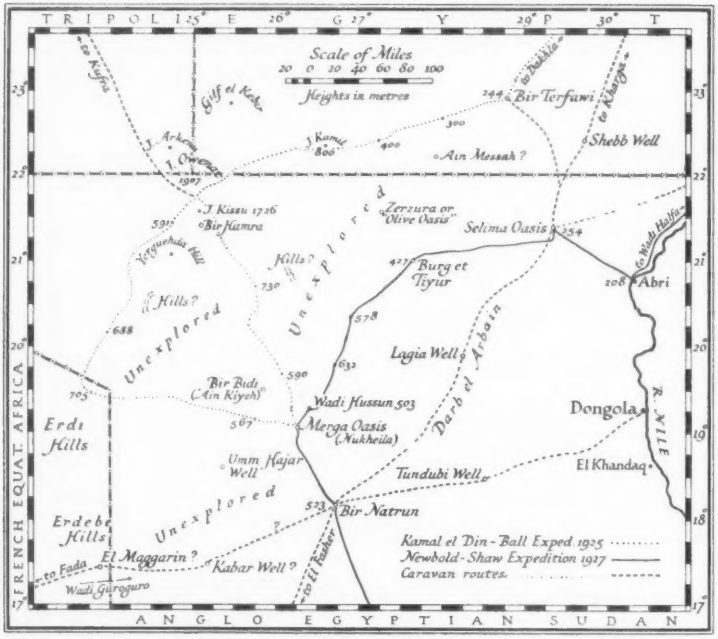
*Vol. xi, No. 2, 1928, "An Exploration in the South Libyan Desert," with appendices on geology, cartography, archæology, botany, equipment, etc.

†*S.N. and R.*, vol. vii, No. 1, 1924, "A Desert Odyssey of 1000 Miles." Also *G.J.*, 65, 1925, p. 464.

‡Vol. ii, 7, September 1928, "Rock-pictures and Archæology in the Libyan Desert."

§The name Merga is unknown in the Sudan, where the Oasis is known as Nukheila to the Kababish and Howawir Arabs, many of whom have visited it on raids. There are subsidiary names, such as Tura el Bedai, Tamar el Qusar, etc. I consider that the Egyptian name of Merga and Sudanese name of Nukheila have an equal claim to preservation on the maps, but have here used Merga to avoid confusion with previous papers.

Their nomenclature is less material, although it may well be that one or more of them were called Zerzura as well as the "lost" village in the Fayum. An *Auasi Zerzour* is shown on French maps as actually existing between Tunis and Zaghouan. Incidentally I do not think the derivation of Zerzura from the Arabic word *zeer* can stand, whether we translate it "water-depôt" with Dr. Ball or "potteries" with Mr. Harding King. It is not a natural derivative from *zeer*, and I see no reason to doubt the previously accepted derivation from *zarzour*, meaning "starling or small bird."* Our discoveries of many corpses of dead birds on the open desert far north of Merga show that there is a regular north-and-south migration stream west of the Arbain Road. Most



The South Libyan Desert, from Egyptian and Sudan Surveys and from native information

of the dead birds we found were of the small passerine type which would be described as "zarzour." The only other possible derivation for Zerzura, of which I can think, is from *Izerzer*, the Berber word for gazelle. But although a Berber dialect is still used in Augila, Siwa, and the village of Manshiah el Aguzah in Baharia Oasis, Arabic has been predominant in the Libyan Desert for the last millennium and an Arabic derivation is to be preferred.

Let us now see what evidence there is for oases and wells—whether to be

*Harding King, *G.J.*, September 1913, "The Libyan Desert from Native Information." For the Arabic word see El Damiri's Zoological Lexicon, 'Hayat el Hayaman,' vol. ii, p. 6. Possibly the root appears in the word *Ganzur*, which is used for a sparrow by the Arabs in Western Egypt near Matruh.

called Zerzura or nameless—as yet unvisited by Europeans.* I agree with Dr. Ball that it is unlikely that "there exists anywhere in the Libyan Desert a permanent water-source which is altogether unknown to the Arabs." The difficulty is to assess the value of the odd half-dozen water-sources which have been reported by Arabs, but have not yet been discovered by Europeans. It is here that the data from the Sudan are valuable.

As regards the northern area, in which Dr. Ball stated one "Zerzura" might exist, I am not competent to write. Such travellers' evidence, however, as there is persistently points to one or more oases or *hattias* between Rohlfs' Regenfeld–Siwa route and Sir Ahmed Hassanein Bey's Zieghen–Jarabub route. The ancient accounts of raids by "Blacks" on Siwa Oasis confirm this.† In addition to the reports of Wilkinson, Rohlfs, Harding King, Beadnell, and Hurst, there is a Sudan Intelligence Report of 1912 which records a journey of a caravan of thirty-eight camels from Dakhla to Kufra in 1904–5. The caravan went west to Mongar (four days), where water was plentiful, thence ten days to "Hattia" well, five days of which were up a sandy hilly road and five over a solid plateau, which may be a northern extension of Gilf el Kebir. From Hattia Well, where the water was only 5 feet down, to Kufra was two days. Possibly Hattia Well is Hassanein's Hattia Mehemsa, later dry. Traces of old roads between Kufra and Siwa have been found, and a well on this route seems necessary. Lastly, Herr Paul Borchardt has produced strong evidence‡ from the mediæval geographers showing that there must have been a regular caravan route up to the Middle Ages between Dakhla and the Eastern Fezzan *via* Kufra. It might have gone Terfawi–Owenat–Kebabo, or Mut–Mehemsa–Hattia–Zieghen–Taiserbo, without any intervening oases, but either route is long for laden caravans.

As regards the southern area we have definite native information of at least three and possibly four water-sources as yet unvisited by civilized travellers.

Firstly we have Mr. Harding King's "Olive Oasis." I agree with Dr. Ball that it cannot exist between Dakhla and Owenat, although I should not care to describe a distance of 375 waterless miles as easily traversable in ten or eleven days by a caravan. It all depends on the grazing and the time of year. But I doubt if this "olive oasis" is Owenat, and see no reason why it should not lie in lat. 21° 30′, long. 27° 20′, the original site given to it by Mr. Harding King in the map accompanying his paper on the Libyan Desert in *G.J.*, September 1913. It is, I think, a great pity that he altered his conjectural position of this oasis, after hearing of the discovery of Owenat, to lat. 22° 30′,

*Zerzura may denote both a real and mythical oases. Owenat, for instance, which merely means in Arabic "little springs," appears in Doughty (vol. i, p. 548): "The strangest fantasy which I found at Teyma is that they have of a neighbouring phantom oasis, Aueynat masallat el Amin. Horses issue from the enchanted appearance of palms, but all fadeth soon if a man approach them."

†See the Anonymous History of Siwa, and Oric Bates' 'Siwan Customs,' Harvard African Studies, vol. i (1917), p. 19.

‡"Die Grossen Ost-West-Karawanenstrassen durch die Libysche Wuste," *Peterm. Geogr. Mitt.*, vol. 70 (1924), pp. 219–223. While it is true that the general migration or raiding routes of the early Libyans were from north to south, there must have been some intercourse between Ghat and the Southern Fezzan and the Nile, in mediæval times. Earlier still the many flint implements discovered between Terfawi and Owenat are a proof of east-west infiltration.

long. 26° 30′.* He had two informants originally. One, a Bedai tribesman, and the more reliable of the two, told of a large oasis seen from the top of a high black hill five days north of Merga. The other said it lay eight days south of Dakhla. The latter might have meant Terfawi, the exact position of which was unknown in 1912. It is about 180 miles south of Dakhla. But the Bedai could not have meant Jebel Owenat or the well-known oasis of Selima, both of which were known to Mr. Harding King. We must therefore assume either that the Arab was lying or that there is an oasis about 150–170 miles north or north-north-east of Merga.

This is supported by three pieces of evidence:

(*a*) It is within the area in which, according to Dr. Ball, the static water and ground contours approach to within 100 metres of each other. At the same time these contours are largely conjectural south of the Sudan frontier. For instance, at our Camp 36 (approx. long. 27°, lat. 20°) we were nearly 120 metres above the conjectured ground contour and 100 metres at Camp 42, Burg et Tiyur, only 40 miles south-east of Mr. Harding King's oasis.

(*b*) It is not far from the fourth traditional siting of Zerzura quoted by Dr. Ball (*G.J.*, 70, p. 123) from Murray's 'Guide to Egypt,' 1896, viz. two or three days west of Selima Oasis. Three days' journey might be 90–105 miles. Mr. Harding King's conjectured site is 130–140 miles due west of Selima.

(*c*) There are old traditions in Halfa and Dongola Provinces of the Sudan about an oasis north or north-west of Lagia. It is said that there is no one alive who has been there, that it is out of range of Lagia, that it is accessible by Selima; but people have also been there from Dongola, that it has perennial water, and that it is quite distinct from Merga and Terfawi. In 1916 Sheikh Fadl el Mula wad Rakha of the Um Metto Kababish, in the course of a report on a journey from Lagia to Merga, told the Governor of Dongola Province, "One of the Ashraf told my father of a place called Um Larzar, which he had heard lay north of Lagia." He found an old track leading west from Lagia and then north. I take Larzar to be a misprint for Zarzar (*i.e.* Zerzura). The "olive-oasis" lies about 130 miles north-north-west of Lagia. Lieut. D. Comyn, who made a journey south-west of Selima in 1906, was told by his guides of a lake or oasis four days west of Terfawi.† They were also Um Metto Kababish. The "olive-oasis" would be four days south-west of Terfawi. Another fable Comyn heard apparently sited the "lost" oasis west of Selima, with trees, gazelle, and deserted houses.‡

On the other hand, Mr. Jennings Bramley, who took a car to End Point 60 miles west of Selima, recorded that "beyond there appears an immense waste, with no feature whatever." The same description applies to the desert north-west of Burg et Tiyur, seen by us on 12 December 1927. Dr. Ball also reports a "level sand plain" on 13 January 1925 at his Camp 9, lat. 22° 19′, long. 27° 21′, about 50 miles due north of the "olive-oasis." All this negative evidence, however, is not of great value, as a large depression can easily be invisible from 25 to 30 miles away. More puzzling is the absence of

**G.J.*, 65 (1925), p. 155, "The Dakhla–Owenat Road." In his original paper Mr. Harding King apparently considered the "Egyptian Oasis" and "Olive Oasis" as identical. In this paper he separated them.

†"Service and Sport in the Sudan," chap. 22. *G.J.*, April 1908, with map.

‡*Ibid.*, p. 301.

tracks. A Terfawi–Merga road is reported by Mr. Jennings Bramley. This would be 310 miles without water or grazing, and if the "olive-oasis" exists the road probably runs through it.

On the whole, therefore, while Mr. Harding King's siting of an oasis between Dakhla and Owenat is, as Dr. Ball thinks, untenable, we must suspend judgment on his oasis reported five days north of Merga. At present we have a certain weight of vague native information in favour of it, and some rather inconclusive negative information against it. Dr. Ball informs me that Mr. Beadnell is digging a well at about lat. 22° 14′, long. 28°. If water is found here it should be easy to ride out on a camel and verify once and for all within eight days whether or not a "Zerzura" exists hereabouts.

As regards the possibility of other oases or wells in the Owenat–Selima–Merga–Erdi quadrilateral, Dr. Ball and Prince Kemal el Din found no water between Merga and Erdi, or Merga and Owenat. Native information, however, from the Sudan states otherwise. In *Sudan Notes and Records*, vol. v (1922),* Mr. A. J. Arkell records a narrative taken down by him from Bidi Audi, a guide of the Bedayat tribe, of a caravan journey from El Fasher to Kufra in 1915 *via* Bir Natrun, Merga, and Owenat. Merga is called Tamar el Qusar, and Owenat Jebel Anuar. Beyond Merga "there was very little grazing." The going all the way to Kufra was sandy with patches of stones. "It only took us two days (from Merga) to reach a well, which the people call *Bir Bidi*." This well had been discovered on a previous journey by Bidi Audi. It took nine days from Bir Bidi to Owenat, "which is a large jebel like Meidob and has four springs . . . and rain falls there." On the return journey the caravan, now heavily laden, took nineteen days between Owenat and Merga, viz. eight days to a well called *Bir Hamra* and seven more to Bir Bidi, and four more to Merga. Neither of these two wells is marked on any map, although a well called *Bidi Oyo* is shown with a query about 21 miles south of Merga on the 1/3 M War Office Map of the Anglo-Egyptian Sudan (1921). This well cannot exist here, as Mr. Shaw and I passed within a mile or two of the spot on 26 November 1927, and it is barren desert. No Europeans had previously traversed the Bir Natrun–Merga stretch, so the error had no chance of being rectified.

Last year I asked Dr. Ball about Bir Bidi and Bir Hamra. He was sceptical of their existence, and indeed the details of his journey and the resulting height-estimations make it difficult to believe in these wells. But I was not prepared to write down a well-known guide as a liar, and fortunately have recently received from the District Commissioner of Northern Darfur an amplified account of these wells by Bidi Audi. He states that he first found Bir Bidi in 1904 when on a raid to Owenat to "lift" Fezzan camels. It was 30–40 miles north of Merga, at the bottom of a crater-like depression in the dunes half a mile in diameter and 100 feet deep. The depression contained *tundub* trees (*Capparis aphylla*) and some *dushash* grass (*Panicum turgidum?*); also a small patch of black rock-salt, and 20-feet pillars of a light-coloured rock (weathered sandstone, like the pillars at Merga?). Water was plentiful at

*Pp. 130–6, 'The Southern Route to Kufra.' The whole narrative is of interest as showing the communications during the War between Sultan Ali Dinar and the Senussi.

2 feet below the surface and overflowed when tapped. On his second visit in 1915, the caravan watered 168 camels and filled 100 waterskins at Bir Bidi, and similarly on their return.

The whole story rings true, and it seems that we must accept the presence of a water-bearing depression, north or north-west of Merga. Mr. Shaw and I found two large depressions, wadis rather than craters, with water just below the surface, but previously unknown, about 20 miles north-east of Merga. I note that at a point 45 miles north-north-west of Merga Dr. Ball records "a few green bushes" at a height of 590 metres above sea-level.* The static water-level here is probably about 500 metres, but artesian water may rise higher. About 40 miles east of this point lay our Camp 35, with estimated height 632 metres. South-west of the 590-metre point the ground slopes down slightly to Dr. Ball's Camp 24 at 567 metres, where again he found green vegetation. In all the circumstances I should site Bir Bidi at about lat. 19° 32′, long. 25° 55′. Merga to Owenat, allowing for slight deviations, is 220 miles. Bidi gives his well as two-elevenths of the way in his first account and 30–40 miles in the second. These two estimates agree.

Now this site is only 20 miles east of where an oasis called *Ain el Kiyeh* is marked on the 1/3 M map of the Sudan. After examining such evidence as exists I am convinced that Ain el Kiyeh and Bir Bidi are identical. No European has discovered Ain el Kiyeh, and I know of no Arab guide in the Sudan who has heard of it by that name. I have been unable to trace any earlier authority for this oasis than Miani's Map of the Nile Basin 1857, which shows a large tract of marsh about the present site of Merga, with Ain el Kiyeh lying at the eastern end and a road running into it from Selima. This road, according to Dr. Cuny (1858), goes on to Wara in Wadai.† Miani identifies his marshy depression with Ptolemy's *Lacus Chelonidæ*. The French 1/2 M map of North Africa 1896 (Region orientale—Feuille 21) shows Ain Kiyeh about 60 miles north of Bir Natrun, "d'après Miani," and it appears that for the last half of the nineteenth century cartographers followed this siting, although some put the oasis 100 miles north of Bir Natrun. Merga was not then known, but some maps, *e.g.* Stanford's Map of the Nile Valley,‡ show a place called *Tagua* between Ain Kiyeh and Bir Natrun.§

Charles Neufeld, who was captured by the Dervishes on 10 April 1887 near Jebel Fantoria, about 40 miles west of Dongola, has a sketch-map in his book 'A Prisoner of the Khaleefa' (1899) which repeats the siting of *El Kiyeh* 100 miles north of *Bir el Malha* (Bir Natrun), with the caravan route from it to

*For these points see 1/500,000 Map of Prince Kemal el Din Hussein's Expedition of 1925 (Survey of Egypt, 1927).

†Dr. Charles Cuny, 'Voyage de Siout à el Obeid,' Paris, 1863. See also M. de Fresnel's "Mémoire sur le Waday," *Bulletin de la Société de Geogr.*, January 1849, where Sultan Sabun's efforts to penetrate the desert west of Merga about 1808 are described. On p. 91 M. Jomard records a route from Selima to Wara taking thirty-four days to traverse. This is marked on the 1/2 M map (Survey of Egypt, 1913) of Sudan and Wadai as passing through Ain el Kiyeh.

‡My copy is undated, but appears to be prior to 1900.

§Perhaps Escayrac de Lauture, 'Le Desert et le Soudan' (1853), is the authority for Tagua, but I am writing away from references. Tagua is El Idrisi's name for the Bir Natrun–Merga region, and may be an early rendering of Zaghawa, the tribe who ranged over these deserts in the eighteenth century, and probably before.

Selima. Moreover, although he does not implicitly state that his Kababish guides referred to El Kiyeh by that name, he implies so and uses it freely himself. I have myself found no guide of the Kababish or Howawir, out of some thirty who knew Merga well, who have heard of this name. On the other hand, in 1922 the Howawir told me of a well north-west of Merga to which they had been guided in 1916 by a captured Guraani raider. It had palms and a spring. The prisoner had told them its Guraan (Tibbu) name, which they had forgotten. More details of this Howawir patrol are given in an Intelligence Report of the Sudan Government dated October 1916, which states that a well was found one and a half to two days north of Tura el Bedai (Merga). A small conical hill of salt stands beside the well. From the well a well-marked track goes north-west. Some of the Arabs followed this for a day, and on the next morning saw a large hill in the distance. The track led to it still going north-west. It seems likely that this prominent mountain was Jebel Kissu, which stands over 5600 feet above sea-level. Dr. Ball first saw it at a point 120 miles north-north-west of Merga. The Arabs may have penetrated as far in three and a half days.

We may therefore assume that Bir Bidi, Ain el Kiyeh, and the Howawir well are all identical and lie about 40 miles north-west of Merga. In a Note written by Prince Kemal el Din Hussein in Cairo in April 1928, he states, "Near Merga is a place called Bidi after a Bidey who discovered it. It contains water, some acacias, and very few palms."*

The confusion of Ain el Kiyeh with Merga in the nineteenth century arose from the fact that Merga itself was not then known by name either in Egypt or the Sudan. Its first appearance on the map is worthy of record. In February 1903 Capt. H. Hodgson, when travelling from Selima to Lagia after the Reoccupation of the Sudan, was told by his guides of an oasis of the Bedayat, *Tura el Bedai*, with a sulphurous lake and palms, four days or 150 miles south-west of Lagia. This was apparently the first report of Merga to a European.† It actually is 140 miles west-south-west of Lagia, but unfortunately in its first appearance on a map in the following year‡ it was for some reason placed 80 miles west-south-west of Bir Natrun and 200 miles from Lagia. Mr. Harding King's researches in 1909 and following years restored Merga to its proper place, and in 1913 the 1/2 M map of Wadai and Sudan showed it only 6 miles north of what we now know to be its true position.

Although the origin of the name El Kiyeh appears to be lost in mystery, light may be thrown on it by the following extracts from a paper by Mr. H. R. Palmer, Lieut.-Governor of Northern Nigeria, in *Sudan Notes and Records*, 1922.§ After describing a battle which took place about 1182 A.D. between Abdulla Birkur of Kanem and the Kai-Bulala tribe "in their country of Kabila," he says:

*Kindly communicated to me by Dr. Ball. The source of the Prince's information would be interesting.

†Gleichen, 'Handbook of the Anglo-Egyptian Sudan' (1905), vol. i, p. 203; vol. ii, p. 193.

‡1/4 M map of Anglo-Egyptian Sudan, Intelligence Dept., Khartum, May 1903; published from War Office, London, September 1904.

§Vol. v, p. 197, 'A Bornu Mahram and the pre-Tunjur rulers of Wadai.' A mahram is an early form of charter in Bornu.

Two interesting points remain: (1) Where precisely was Kabila? (2) who precisely were the Bulala? On these points it seems probable that enlightenment may come from the Sudan. In the first place, the older name for the Bulala is Kai, Kayi, Ke or Ki. They were not Teda, but are spoken of in the Bornu MSS. as . . . people who carried oryx shields. . . . According to the Kanuri of the present day Kabila was a town in the vicinity of a well, on the route between Abeshe and Dongola, now called Kabar—a watering-place which the Kanuri call Ko Tugundegwa or Ko Annabi Musa. Tugundegwa means "of the four seats," and it is said that the Arabs also call the place "Manzil el arba'a." Ko means rock in Kanuri. A Wadaian states that this Ko Tugundegwa is east of the Annedi country and five days' camel march north of Masrub, the stages from Abeshe being Abeshe–Fada–El Maggarin —thence by desert to Kabar.

If the Abeshe route started east from Fada, El Maggarin should be a waterhole or cistern somewhere on the eastern foothills of Erdebe, near Wadi Guroguro. This itself would be about 150 miles (five days) north of Mazrub. So Kabar should not lie north of lat. 17° 30′. If, however, the road went to Dongola *via* Fada–Erdi–Ain Kiyeh–Merga–Lagia, we might ignore the distance from Mazrub as being an underestimate and boldly identify Kabar with Ain Kiyeh and Bir Bidi on account of the name of the Kai or Kiyi tribe.

On the whole I think we must suspend judgment about Kabar. We know very little about the desert between Bir Natrun and Ennedi. The Howawir found no water in their 1916 raid on Ennedi from Bir Natrun between the latter wells and Guroguro, but there is a well called Umm Hajar reported variously as one and a half days south-west of Merga and as south-west of Bir Natrun, also a hill with a rock well called Teigo 90 miles south-west of Bir Natrun. This latter may be a confusion with the Teiga plateau and wells north-west of Jebel Meidob. In any case we cannot say more than that the Kiyi tribe seem to have given their name to one or more wells or oases in the area west of Bir Batrun, which have yet to be surveyed. There was obviously considerable movement in these deserts in the Middle Ages.

To revert to Bidi Audi: his amplified account describes Bir Hamra as seven days north of Bir Bidi and 30 miles south of Owenat. "There is a patch of cotton soil with a few *tundub* and stunted *seyal* trees and the usual dried-up *dushash* grass. There is a good supply of water at a depth of two feet." However authentic Bir Bidi sounds it is difficult to credit the existence of Bir Hamra. The "cotton soil" seems impossible in what we know to be a sandy plain with gravel patches and gneiss outcrops. It must be within 10 miles of Jebel Kissu, which is 5663 feet above sea-level; yet Bidi does not mention this mountain, which Dr. Ball found visible from 70 miles away. I conclude that

(*a*) An oasis, possibly previously known as Zerzura, probably exists either at lat. 21° 30′, long. 27° 20′, or within 40 miles to the south-west of that point.

(*b*) An oasis discovered by Bidi Audi in 1904 lies about 40 miles north-west of Merga, with a few trees and grass in a small depression with water near the floor-surface. This oasis is known to the Guraan of Ennedi, and was rediscovered by the Howawir in 1916.

(*c*) An oasis or well known as Ain Kiyeh from the mediæval Kai-Bulala tribe is either to be identified with Bir Bidi or with one of the wells reported by Arabs, but as yet unvisited by Europeans, west or south-west of Bir Natrun.

CHARLES MONTAGU DOUGHTY

THE LIFE OF CHARLES M. DOUGHTY. By D. G. Hogarth. *Oxford University Press. London: Humphrey Milford* 1928. 10×6 *inches;* xii+216 *pages; maps and illustrations.* 18*s*

AT the time of his lamented death a year ago our late President, Dr. Hogarth, had so far completed the life of Doughty that his son has been able to finish it with only slight additions and rearrangement of the later chapters from the original draft. Fellows of our Society will value it as much for its being the last work of the distinguished scholar they remember so vividly as for the subject of the Memoir, "an extraordinary man to whose fame the world is not likely soon to become indifferent." In particular they will be curious to see how it came about that a man who felt he received scant encouragement from our Society when he made his one great journey in the seventies of last century should have been awarded our Founder's Medal in 1912; that his book which in 1885 was reckoned almost unreadable by all but a few enthusiasts should during the great war have been eagerly sought by staff officers in the Eastern theatre; or that the biographer of a famous traveller should be compelled to "have refrained from appraising or criticising seriously the poetry to the production of which Doughty devoted his last thirty-five years, that is, more than half his adult working life, and from attempting to assign to him his place in the poetic hierarchy."

Few children, says Dr. Hogarth, can have been born to surroundings of more complacently aristocratic and conservative sort than Charles Montagu Doughty, who was brought up for the Navy in the traditions of his mother's family, the Hothams, and never got over his disappointment in 1856 at being rejected for a slight impediment in his speech, so that in 1919 he "wistfully regarded even a war-time title of Temporary Commander as enviable." Having matriculated at Caius College, Cambridge, in October 1861, he was remembered sixty years afterwards as shy, nervous and very polite, with no literary tastes whatever, and so little knowledge of Greek that it took him four terms to pass the Little-go. Having migrated to Downing, and degraded for a year to study geology and glaciers in Norway, he took the Natural Sciences Tripos in 1865 and was placed in the second class because, according to one of his examiners, he "had such a dishevelled mind. If you asked him for a collar he upset his whole wardrobe at your feet." After the examination he returned to Caius to take his degree, and then took his name off the books again, which did not however prevent his old college from making him an Honorary Fellow in 1907.

Leaving Cambridge with some private means and no career in view he spent a year or two in London and Oxford, and the next seven in wandering slowly, living uncomfortably, in Mediterranean lands mostly, but ending in Sinai and Damascus, where he formed the ambition to visit Medain Salih, and applied to the British Association, of all people, for a grant in aid. This was his first failure. He forgets that this body meets for making grants but once a year, and they, having resolved on a report by Major C. W. Wilson not to entertain his request, were not successful in conveying their refusal to him. But, curiously enough, that same report was passed on to our Society, and when a long letter written from Vienna to our then President, Sir Henry Rawlinson, came before the Council in November 1875, the report was once more successful in damning the proposal, which was "civilly declined." But, as Dr. Hogarth truly remarks, the request was not only for funds, but that the Society should obtain for him a firman from the Sultan, which could be attempted only through the Foreign Office, who would certainly have sent instructions to the British Consul at

Damascus "enjoining him to frustrate the project. Doughty would then have been marked at Damascus by night and day, and every exit would have been politely but persistently barred till the Haj was long lost to sight. Those friends knew best who told him to entreat no one any more, but just to go his way and try the luck of the bold." So on 10 November 1876 a man "clothed as a Syrian of simple fortune" rode a mule out by the southern gate. "Doughty had taken the best, because the one and only, way that offered the least chance of attaining his end. It had been idle from first to last to expect any one else to shoulder the responsibility of forcing a solitary British Christian on the Haj."

Chapters iii and iv give for the first time a consecutive story of the wanderings which are told in the thousand pages of 'Arabia Deserta.' To write them Dr. Hogarth went, not to the book itself, but to the diaries and notebooks which Doughty had presented at the Director's request to the Fitzwilliam Museum in 1922, though their owner had protested that besides being hardly legible they were unintelligible to other eyes: "with only too much justice," says the biographer. We could have no better comment on the style of the book as a narrative, or of the value of this last service which Dr. Hogarth did to scholarship, working against time to complete the task before his doctors should insist on the rest that came too late. Tired out though he was, his pen could still write those clean-cut effective sentences that contrast so curiously with Doughty's vaunted Elizabethan.

After twenty-one months "of such solitary adventuring as perhaps no one of his race, station, and culture has sustained before or since," Doughty emerged at Jidda and later took ship for Bombay, where he went into hospital and vainly tried to borrow from the Asiatic Society some volumes of Chaucer not the Canterbury Tales. What is more surprising, he failed to induce any one in Bombay to trust him enough to cash a cheque for him, even though the Society got a lecture out of him which in the circumstances he did not feel called upon to make elaborate. By good fortune a troopship commanded by a cousin was sailing for home, and the Captain gave him a passage as his guest; yet the Captain's daughter recalls her wonder, as a child of eight, at seeing the strange unknown cousin arrive in Suffolk in December wearing "whitish cotton clothes of some soft Eastern material, and a green band often twisted round his waist; sockless feet thrust into heelless sandals, and using when he went out a large green umbrella. This in December struck us immensely." And indeed, for a man born in complacently aristocratic and conservative surroundings to return to them thus on a British troopship was more than singular.

'Tis a great merit of this biography that we are given such little side-lights on the personality of the subject, and allowed to draw what moral we please. When Doughty came back to London our then Secretary, Bates, is accused of not answering letters, and when later the President asked Doughty for a communication to the Society, "he seems to have considered that his reception had been below his pains and his merits, and that the Society which had failed to help him to go to Arabia had not established since his return any claim upon his immediate services." Not indeed until nearly five years later did he deliver to our Society the lecture which got him and the Secretary into further trouble. He had written to Bates, "I will use the liberty to speak mostly at the evening meeting but have the paper written or nearly written then for publication." But Bates, perhaps knowing his man, arranged for a shorthand report of the speech, which was written out with considerable modification and then drastically edited by the Secretary. Any man who has been called upon to revise the reporter's version of his own clear and straightforward contribution to the discussion at an Evening Meeting can sympathize with Doughty's fury at the result. "As an

English Scholar I will never submit to have my language of the best times turned into the misery of to-day—that were unworthy of me. Some words I should alter myself upon more leisure and better advisement in the revision to make all run more smoothly. It were a dangerous task for others to alter a phrase." And in a second letter: "Of that printed from the shorthand report I found I could make nothing worthy whatever. I had as soon the good Sherif had hanged me at Tarif as be made so to speak Middlesex-like. I have therefore written from my notes just as I would have spoken if I had found time. Pray let no word be altered, or else I retire and must disown it altogether as not my work. It is chaste and right English of the best time and without a word of Costermongery and very hard for their best unstudied pens to amend."

Nevertheless an unfeeling Council insisted upon printing pretty much as already put into proof, and Doughty gave up the contest in "sorrowful acquiescence." A note in the diary of Dr. H. O. Forbes shows how little our Society at that meeting appreciated the one appearance of Doughty on our platform. "At R.G.S. C. M. Doughty. Arabian traveller; extraordinary story; remarkable diction. A tall wiry man with a fatigue-worn face"; and adds that there was no enthusiasm "even by Bates." Sir Henry Rawlinson was in the chair, about whom Doughty wrote that "Mr. Blunt having made some communication of a journey to the borders of Arabia, Sir H. Rawlinson summed up all Arabian travellers and had the forgetfulness!? not to mention me, and though by the inquiry for inscriptions I saw that he very well remembered me. That was to make me as far as he could pass for no Arabian traveller." And this rather poor opinion of Rawlinson's attitude to Doughty is supported by Dr. Hogarth's terse account of the discussion following the paper, "the Chairman closing it with discursive remarks on Semitic scripts as observed by himself rather than by Doughty."

Officers of scientific societies must read with concern this painful story, so carefully told by the President of the Society that bore the brunt of Doughty's displeasure: though he regarded the British Association also as unfriendly; and a paper he read to the Geological Society never got printed at all. Dr. Hogarth sums up the case sympathetically: "There were years of disappointment following disappointment and of cumulative anxieties which would have tried severely men of stronger health and more equable temper than are usually vouchsafed to the *genus irritabile vatum*. . . . It is true that he often provoked and kicked against pricks which men less withdrawn into themselves and more conscious how others habitually think and act would never have encountered. But who that appreciate the qualities of Charles Doughty will even regret their inevitable defects?"

A critic has observed that Doughty was "provincial" in Matthew Arnold's sense of the word: he was never alive to what was happening in town, as witness his letter of congratulation to a friend's son on the award of a prize for literature: "Not having a 'Who is Who' by me I do not know who Mr. Chesterton, who delivered the prize, may be." This want of *savoir faire* is sometimes observed in the greatest travellers: they are unpractical in the ordinary affairs of papers and publication. The long story of the tribulation of Doughty and the Cambridge University Press is told by Dr. Hogarth with the sympathy natural to a warm admirer of Doughty and a Delegate of the sister Press. The MS. of 'Arabia Deserta' had "rolled about publishers' offices gathering damning endorsements." A well-known London publisher had pronounced it as hardly intelligible: too long and obscure: must be put into shape by some competent man. Happily the Cambridge University Press were induced by William Wright, Robertson Smith, and Henry Bradshaw to undertake the publication, on terms

which left Doughty some financial liabilities: but almost at once the usual difficulties of revision arose, and the further printing was suspended, not to be resumed "unless Mr. Doughty gives an undertaking in writing to accept the suggestions of Professor Robertson Smith without discussion." The Press, wrote the latter, "are willing to spend money on Arabia but not on your experiment in English." Doughty's financial liability was much increased by the excessive corrections that he made in proof. He had conceived, he said, in his early inexperience, that printing was an adjunct to literature, meaning, says his biographer, that he had regarded first printed proofs as mere suggestions to the author. When faced with an account showing that he owed more than seven hundred pounds to the Press, he first asked our Society to guarantee him against loss, which proposition was declined with regret, and then he asked the Council for "a small grant out of their vast resources" to pay for assistance in revising the spelling of Arabic. He was further anxious that the first volume should be reviewed in our *Proceedings* before the manuscript of the second had even been delivered, which the Press naturally refused to allow. His marriage further delayed the completion, but at last, early in 1888, the two volumes were published at the high price of three guineas, which precluded a quick sale, while "the strange style maintained throughout a work of over 600,000 words discouraged even the very elect." But no steps were ever taken to enforce payment of any part of the liability, and when the account was finally closed the Syndics of the Press wrote that they did not regret their loss, as thus publication was assured. No publisher, says Dr. Hogarth with the weight of his great experience, ever had author to deal with whom temperament, inexperience, and ill-health made more difficult than Doughty, and no author ever received from a publisher treatment more generous, long-suffering, and honourable than the author of 'Arabia Deserta.'

If it should seem that we have given in this notice a disproportionate attention to these aspects of genius, we may plead first that Dr. Hogarth has devoted to them in his memoir so minute an examination, and delivered so nicely balanced a judgment, that it makes to those who are interested in the work of a scientific society the most valuable part of the book. There had been a general impression that in the early days Doughty had been treated shabbily, and we are now for the first time able to judge how far our Society was to blame for inattention or failure of appreciation, and where circumstances were beyond its control. To Dr. Hogarth more than to any man we owe it that appreciation though long delayed was given at last in the award of the Founder's Medal of 1912.

MINOAN CRETE: A REVIEW

THE PALACE OF MINOS. A comparative account of the successive stages of the early Cretan civilization as illustrated by the discoveries at Knossus. By Sir ARTHUR EVANS. Vol. II, Parts 1 and 2. *London: Macmillan* 1928. 10×7 *inches;* xxii+844 *pages; illustrations, plans, and* 30 *supplementary plates. Seven guineas*

TO this sumptuous and detailed record of a unique archæological exploration, the first volume of which was reviewed in the *Journal* for September 1922, the student of Ancient Geography may turn in the hope of learning something of the geographical relations to the Mediterranean and adjacent regions of Minoan Crete. If he does so he will not be disappointed, though he may often wish that the evidence were more definite and satisfying. But he will perforce admire the way in which the author, by a combination of vast knowledge and a remarkable power of interpretation, manages to draw most ingenious and plausible inferences regarding Minoan Crete, and the connections of its inhabitants with other peoples and countries of their time.

A number of geographical questions emerge in the course of the detailed descriptions of the Palaces, Houses, Architecture and Art. First and foremost is that of overseas communication between the island and Egypt, Cyprus, Anatolia, Mainland Greece, Italy, and Iberia. Here must be noted the supreme geographical factor concerning Crete, viz. its situation, 'a halfway house between three continents, pointing east and west, and barring both the Ægean and Libyan Seas.' Numerous facts are marshalled to show the connections and communications between Crete and Egypt, and the varied indebtedness of the former to the latter. They warrant the conclusion that "long before the foundation of the Great Palace, the site of Knossos was playing a historic part as a centre of connection between the Minoan Priest-Kings and official Egypt: that there was at least one ancient residential seat on this site whose occupants made it the goal of an ancient trade route from the land of the Pharaohs." The fascinating subject of the influence of Egypt on Minoan Art constantly recurs, and the ingenious suggestions regarding the probability of native Egyptian craftsmen instructing Minoan workmen within the precincts of the Palace, or of Minoan workers learning their art as apprentices in Egypt, are of exceeding interest as showing the intimacy of the connection between the Island and the Valley of the Nile. This connection may be said to have had a new light thrown upon it by one of the author's more recent discoveries: the existence in Minoan times of a great north-to-south road across the island from Knossos to a port on the Libyan Sea. This road appears not only to have served Knossos with commodities from the mouth of the Nile, but also as an avenue for products brought from the Ægean to the Port of Knossos, and thence transported across the island to Egypt. There are facts which point to other African connections, such as the adoption in Minoan cult of ostrich-egg rhytons—'a purely African form of vessel at home in the Sudan and the Libyan desert'—or Minoan tributaries bearing elephant tusks depicted on a wall painting in the tomb of Rekhmara at Thebes. It is true that a Syrian source for these tusks may be possible, for we know that Thothmes III hunted herds of elephants in Northern Syria. More interesting still is the problem opened up by a fresco found in the area of the House of Frescoes at Knossos. This, known as the Fresco of the Captain of the Blacks, represents a Minoan officer leading a troop of negroes at a run. Here, as always, Sir Arthur is fertile in suggestion. He sees in this Black Auxiliaries, and remarks that it is significant from the epoch to which it belongs, the age of the great expansion overseas and of comprehensive schemes

that must have strained to the uttermost the man power of the island. This expansion was to Mainland Greece, and he thinks it quite possible that the Minoan commanders made use of black troops for its final conquest. There is evidence, he adds, towards the close of the First Late Minoan Period, *c.* 1500 B.C., of an intensive occupation of the mainland of Greece from Minoan Crete, for its culture from this time stands forth as overwhelmingly Minoan, and it is only towards the close of the succeeding period, *c.* 1350, that it begins to show a differentiation that makes the term Mycenæan admissible. That this overseas expansion extended even beyond the Ægean is supported by the tradition of an expedition to, and settlement in, Sicily; a tradition which receives some slight confirmation from archæology. In this connection it is significant that liparite, a kind of volcanic glass peculiar to the Æolian Island, was imported into Crete from the close of the Early Minoan Period, and vessels were carved out of it by lapidaries at Knossos. From the same age date intimate relations with the Cyclades, this being especially noticeable with regard to Melos, famous for its obsidian which occurs in the Neolithic deposits.

Discovery in Cyprus suggests that communication with that island from Crete was much earlier than has generally been supposed. From the very beginning of the age of the Cretan Palaces the traces of direct relationship with the easternmost Mediterranean coast become more and more evident. Though through it there is little or no evidence of direct communication with Mesopotamia there are signs of cultural influence therefrom, as *e.g.* the discovery at Platanos of a Babylonish cylinder of Hammurabi's time, the use of inscribed clay tablets, and certain characteristic features in the structure of the Palace. Connection with Syria is shown on a Theban tomb painting, where Minoans are depicted associated with Syrians. From such facts the conclusion is ventured that in the time of Thothmes III the carrying trade between Cyprus, North Syrian ports, and the mouth of the Nile was largely in Minoan hands. There are also signs of Minoan reaction in Pontus, so that it is possible Cretan merchants had at this time extended their activities to the south coast of the Euxine.

Communication with Italy is inferred from the discovery near Volterra of an elongated triangular dagger, of typical Minoan form, identical in shape with a silver dagger from a primitive Beehive ossuary of Kumasa in Crete. Associated with the Italian discovery were tin studs or buttons with characteristic V-shaped boring, evidently belonging to a class of objects found in Iberia and Britain. Examples in jet, amber, and bone have been found in Late Neolithic or Early Bronze Age interments in Britain. The tin may have reached Italy by a western trade route along which passed the Irish halberds found in Northern Italy. Irish halberds discovered in the Po valley are substantially identical with a bronze specimen with five rivets capped with gold from the VI grave at Mycenæ. The gold here, says the author, is a fitting illustration of more or less direct connection between prehistoric Greece and Ireland, the Eldorado of the West.

What overseas connection was there between Minoan Crete and the Western Mediterranean, with Iberia and beyond? If Minoan navigators sailed direct along the Western Mediterranean the region they would most likely strike would be the rich silver-producing area of South-East Spain. There have been found characteristic imported beads, and primitive stone images of an Ægean class of Early Minoan age. These segmented beads of faience, of a form which Crete early derived from Egypt, have been found as far afield as in Bronze Age barrows in the south of England. May this be taken as an indication that through Minoan commerce tin from Cornwall was transported to Crete? A

further question may now be asked, viz. was the western route to Iberia *via* Malta? Minoan connections with Malta are suggested by the curvilinear decoration of its Megalithic monuments, its sanctuaries associated with the cult of the dead, and Pillar worship. A most interesting discussion leads up to the conclusion that Malta may well have been a market where Minoan traders could exchange their wares for the products of the most distant Western Mediterranean regions. By this route, then, the all-essential tin (which was being used in increasing proportion for alloying copper in the Ægean from the close of the Early Minoan Age) may have reached Crete. There is also the possibility of its having come from the Italian side through the western trade route mentioned above. Assuming its arrival in Crete, the question is asked, Did the Minoans carry tin to Egypt? We are undoubtedly here in an atmosphere of speculation, as is usually the case when the origin of bronze is in question. The author, however, puts forward certain considerations worthy of attention. The first prevalence of true bronze in Egypt, he remarks, coincides with the diffusion of a curvilinear system of decoration taken over from Crete. And it is possible that both these contemporary phenomena were due to Minoan agency, facilitated by the transit route across the island. A curious fact is the discovery at Abydos in an 18th Dynasty burial of a pilgrim's flask of pure tin, of Ægean type. On an 11th Dynasty relief a procession is shown bearing ingots, probably of tin. Were these bearers Minoans? Remembering how Cretans figure in processional compositions in 18th-Dynasty burials, and similar representations on frescoes in the Palace at Knossos, it does not seem a too-far-fetched supposition.

Turning now to the island itself, an interesting question is: What was the size and population of Knossos? Judging from the size and number of the houses, the population of the central, well-to-do region, comprising the Palace and the quarter of the burgher class, in the first half of the seventeenth century B.C., is calculated to have been about 12,000. In the outlying quarters, three times as large, where the houses were much smaller and closer together, there were probably at least 70,000, making a total for the whole town of 82,000. Adding to this the Harbour Town, which stood to Knossos much as the Piræus to Athens, the population must have been 100,000 or more. Minoan Knossos, says the author, in its great days was a centre of human habitation to which no rival, certainly on the European side, could have been found. No fenced city on the Syrian coast could have had either its expanse or its population, and he adds further that the populousness of Minoan Knossos was an inheritance from immemorial time for successive strata of Neolithic times exceed in volume those of any Neolithic site on European soil. Remains of the late Stone Age also abound along the sea front of the Harbour Town.

Crete is subject to earthquakes, Knossos and Candia being apparently a centre of such seismic disturbances. Sir Arthur Evans is able to speak feelingly on this subject, for he personally witnessed the effects of the earthquake of 1926, when damage was done to the Candia Museum in which the priceless relics from Knossos are housed. It has been calculated that during the last five hundred years there have been on an average two earthquakes per century in Crete. This constant liability of the Knossos district to earthquakes explains the successive destructions of the Palace. The earlier Palace suffered from such a catastrophe towards the close of the second Middle Minoan Period, *c.* 1850. It was rebuilt at the beginning of the next or Third Middle Minoan Period. At the end of this Period *c.* 1600 B.C. another earthquake occurred, causing immense damage to the Palace. But this did not fundamentally affect the cultured life of the Minoans. Just as in modern times great cities, like San Francisco and Tokyo, after being overthrown by earthquakes, have been soon

rebuilt on improved lines, so the catastrophe at Knossos was followed by a quick recovery. The rebuilding of the Palace ushered in a great cultural development, and revival in what may be called the Transitional Period, that is, from the end of the Middle to the beginning of the Late Minoan Age. This transitional period has in fact been called the Golden Age of Crete. As often in modern times these seismic shocks were followed by extensive fires causing further damage. Thus the recurring catastrophes at Knossos were evidently due to terrestrial causes and not to hostile invasions as were formerly supposed.

In the rebuilding of the Palace after the earthquake at the close of the Third Middle Minoan Period, a diminished use of timber is observed in its construction; for example, gypsum instead of wood is now used for door jambs. It is inferred from this that deforestation of the island was taking place, and the suggestion is made that this was probably a cause of the downfall of Minoan domination, as timber had to be brought from overseas. This change in the vegetation may have been due, partially at least, to a diminution of the rainfall. The discovery of a watercourse showing that formerly it had a greater flow, is explicable on the assumption that the rainfall of the island has decreased since Minoan times, when the climate was more humid. This greater humidity in the past also receives some support from the changed distribution of certain plants, *e.g.* the wild rose is no longer found near Knossos, and the violet has retreated to distant mountain glens.

Crete has been called by the author of this fascinating work the Cradle of European Civilization. That it can claim this honour is in no small part due to its geographical position, and these comments may fitly conclude by quoting his own eloquent words: "Insular, but not isolated, Crete was able to develop a civilization of its own on native lines, and to accept suggestions from the Egyptian or Asiatic side without itself being dominated by foreign conventionalism. Primitive navigation, first perhaps reared in the land-locked harbours of the smaller Ægean Islands, was early enlisted in the Minoan service. Long ages before the birth of Venice, Crete had 'espoused the everlasting sea,' and the first naval dominion of Mediterranean waters was wielded by Minoan Knossos."

E. A. P.

THE KAMES OF FINLAND AND THE DATE OF THE LAST GLACIATION

ÜBER DIE OSE MITTELFINNLANDS; Die Entstehung des Materials und der Formen der Ose. By I. LEIVISKA. (From *Fennia*, 51, No. 4, Helsinki 1928, 207 *pages; 25 plates and a map.*)

THE LAST GLACIATION: with Special Reference to the Ice Retreat in North-Eastern North America. By ERNST ANTEVS. (American Geographical Society Research Series No. 17. Shaler Memorial Series.) *New York: A. G. Society* 1928. 9×5 *inches;* x+292 *pages; maps and diagrams.* $3.50

THE drifts of Finland include a series of concentric ridges of sand and gravel, of which the most conspicuous extends as a double band across Southern Finland from the coast at the southern corner on an arc north-eastward to Koski, about 60 miles north of Helsingfors; there it is joined by a branch from the west and continues eastward till it bends to the north and north-west to Joensuu, where it turns abruptly to the west. This band of drifts is known as the Salpausselkä, and its two concentric ridges are usually from 10 to 15 miles apart.

On both sides of this formation are many smaller narrow ridges or irregular bands composed of the same materials and similar in structure; they are usually at about right angles to the Salpausselkä; they are known in Finland as "harju" and in Sweden as åsar, which is anglicized as osar. Their origin has been the subject of long controversy. They have been generally attributed to rivers draining a melting ice-sheet; but opinions differed as to whether the osar were laid down in channels upon the ice or in tunnels under it. In recent years they have been widely accepted as delta deposits laid down at the mouth of a glacier river, and built up into a long ridge as the river mouth receded with the recession of the ice margin. This view has been mainly due to the work of Baron G. de Geer.

A detailed account of the marginal ridges of Finland, the Salpausselkä, was published by I. Leiviska in 1920, and after further field work in the years 1920–26, including journeys to study the corresponding formations in Lapland and Iceland, he has issued a detailed description of many of the osar of Mid-Finland. In his description of the formation of osar the author is emphatic that the delta theory of de Geer "is impossible," and his evidence justifies that verdict as far as the Finnish osar are concerned. His photographs and detailed profiles show the absence of the seasonal banding which is so conspicuous in the Swedish osar and indicates for them recurrent deposition along a slowly moving position. Leiviska shows that the Salpausselkä is a marginal formation, and thus corresponds to the Scottish and Irish kames. It is similar in course to a marginal moraine, but differs from moraines by being due to the combined working of a glacier and the flood water set free from it; or to the water in which the glacier may end. The ice supplies the material which is sorted and deposited by the water; whereas a moraine consists of material dumped directly from the melted ice. That the Finnish osar are not deposited by rivers is indicated by abundant evidence; their material and structures are so similar to that of the Salpausselkä that it is impossible to draw a sharp boundary between them, and the osar, instead of running along the valleys, which would be the natural drainage channels for the subglacial streams, often occur along the tops of the higher ground between them. Herr Leiviska also insists that no glacial river is known to produce osar.

The shape of the osar according to the author is not due to original deposition; their "Hauptformeneigentumlichkeiten," he insists (p. 153), is due to subsequent denudation, and his photographs of some sections in the osar, *e.g.* Fig. 19, show

that the bedding is cut across by the outer slope of the ridge, which was clearly part of a wider sheet.

The author supplements his description of the Finnish osar by a discussion of the northern literature on the subject; he makes no reference to the corresponding formations elsewhere, or to the literature upon them. These Finnish drift hills are very similar to those in Ireland, that are included there under the general name of eskers; they include marginal formations, the kames, which correspond to the Salpausselkä, and radial ridges which correspond to the Finnish osar. Leiviska divides the osar into two groups—the lang-ose which are transverse to the marginal formation, and the quer-ose which are parallel to it. As the latter are similar in course and composition to the kame, they would answer, according to the classification widely adopted in America and Britain, to kames instead of to osar. As the osar of Finland differ in important respects from those of Sweden, it might be convenient to adopt the Finnish term "harju" for the Finnish variety, just as the Swedish name "osar" has been adopted for the seasonally banded variety of which there are a few representatives in Ireland and which appear to be the common type in Sweden.

These Finnish kames are referred to under their name of "Salpausselkä" by Dr. Antevs in a valuable memoir which deals especially with the date and duration of the last Ice Age. He made extensive journeys from 1921–25 in the United States and Canada, on behalf of the Shaler Memorial Trust, applying to the glacial deposits there the method developed by Baron de Geer in Sweden. It is based on the view that in banded glacial beds a complete band represents the deposit of one year. Dr. Antevs has helped to remove from that method the distrust due to de Geer's conclusion that Scandinavia was covered by an ice-cap only a few thousand years ago. Dr. Antevs extends the period to the more probable estimate of 40,000 years. His work nevertheless represents glacial deposition and recession as surprisingly rapid. He describes the Finnish kames as 1½ mile wide and up to 260 feet high; yet he considers that they were formed in 659 years, and that the ice retreated from them at the average rate for the first 500 years of 1247 feet a year. The glaciation Dr. Antevs correlates with important geographical changes elsewhere, and he calculates that the alluvial deposits of Egypt begin with the first arrival there of Abyssinian water through the Nile only 14,000 years ago. The rapid melting of the Scandinavian ice Dr. Antevs attributes to the Gulf Stream having then first broken into the Norwegian Sea. This suggestion will not help those who do not retain their early faith in the influence of the Gulf Stream on Europe. The main value of Dr. Antevs' book is in its detailed account of the American glacial deposits he investigated. His observations are preceded by a summary of the records of glaciation all the world over, and accompanied by an extensive bibliography. He adopts the view that the maximum glaciation in all countries was approximately synchronous, and the largest estimates of the extent of the glaciers; his account, for example, of the former range of those in Asia represents them as far more extensive than does the recent map by Berkey and Morris in their Geology of Mongolia. He also estimates the ice-sheets as of a thickness which some authorities reject as physically impossible, *e.g.* 18,000 feet for the Kewatin, and 14,000 feet for the Labrador ice-sheet. Accordingly the amount of water that would have been withdrawn from the ocean to form this ice would have lowered sea-level throughout the world by 305 feet. The weight of testimony in the discussions at the recent Geographical Congress at Cambridge was, however, that raised beaches and old shore-lines are so irregular in height that the balance of evidence is against the modification of sea-level by formation and melting of the ice-sheets of the last glacial period.

J. W. G.

REVIEWS

MAP OF ROMAN BRITAIN. Second edition. *Southampton : Ordnance Survey of the United Kingdom* 1928. 8 × 6 *inches;* 16 *pages and map.* 4*s*

The first edition of this map, published in 1924, was immediately recognized as a standard work and as one of the best archæological maps ever produced. It was so vastly superior to any previous map of Roman Britain that no one who understood its purpose had anything but praise for it, or felt disposed to demand anything better. There were, of course, disgruntled local antiquaries who fumed over the omission of their pet "Roman roads"; but their complaints were the fruit of misunderstanding. They did not realize the fineness of the mesh through which topographical evidence has to pass if it is to reach the Ordnance Survey's printed sheets. Other critics pointed gloomily to fragments of road shown as leading from nowhere to nowhere, as if they fancied that the Survey's draughtsmen had forgotten to put in the continuations of them; not realizing that the Survey's draughtsmen are not encouraged to draw things out of their heads, and that a road whose course is unknown cannot be plotted on a map. In these ways the first edition set a new standard of accuracy and conscientiousness in English archæological maps.

In the second edition this standard is maintained and even surpassed. Several new pieces of road are inserted, but quite as many have been deleted or marked as doubtful after a further review of the evidence. For that alone, the second edition would have been worth while. But that is the least of its new features. In the first place, the archæological material is overprinted on a new 1/M physical map layered with ten tints for land-heights and eight for sea-depths; a very fine piece of work, of which the Survey might well be proud. Then, an attempt has been made to reconstruct the primeval vegetation-map of the country by laying down symbols for "dense woodland" and "open woodland" based on geological evidence. This was a task of great difficulty, and the results may be open to correction in details; but in the main they are trustworthy, and completely supersede all previous attempts to do the same thing. On this twofold basis, the new map shows, not only roads and towns and forts as before, but villages, country houses, and even scattered finds, when these are such as to indicate settled occupation. We thus have, what has never been attempted before—though the Victoria County Histories have done it for single counties—a map showing everything that is known about the distribution of the population in the Roman period. Now, for the first time, we can begin to talk about the factors governing that distribution, and estimate the nature and solidity of the economic foundations on which Romano-British civilization was built. But not in this review.

A map of this kind, however, differs in important ways from one showing the modern population or visible features of a country; it is more like the map of an unsurveyed country that is compiled from travellers' observations. A blank may mean that there is nothing there, or it may mean that no one has been to look. A friend of the present reviewer, looking at an archæological map of a remote and mountainous district, was heard to remark that prehistoric man seldom ventured more than a few miles from the nearest railway-station. Here, however, in the admirable letterpress that accompanies the map, the user is warned that certain apparently uninhabited areas are really areas of insufficient exploration.

Where there is so much to praise, it may seem ungracious to enumerate faults; but there are a few. They are chiefly concerned with the use of symbols, and these are mere matters of proof-reading. The symbol for a *colonia* is too much like that for a village, with the result that York might easily be taken for the latter

instead of the former; and—more serious—Lincoln, Colchester, and Gloucester appear not as *coloniæ* but as simple towns. Corbridge, on the other hand, which is surely a respectable town, appears in the humble rank of "finds indicating permanent settlement." Certain earthworks in Redesdale, shown as "temporary forts," ought perhaps to have been marked by the symbol for "large marching camps." Here and there, again, more information might have been inserted. At Ardoch, both permanent fort and temporary camp are symbolically shown; why not also at Makendon? It is unfortunate that the site at Burgh-by-Sands has been rechristened Burgh Head, which is the name of one end of that village. And it is not easy to see on what principle certain milestones have been inserted, and others, whose place of discovery and original situation are hardly less certain, omitted. But these are trivial blemishes upon a work which, as a whole, it would be difficult to praise too highly. It is absolutely indispensable to every student of early Britain. It will hang in every properly equipped school in the country, and serve as the basis for every lesson in early British history.

R. G. COLLINGWOOD.

ENGLAND IN THE MIDDLE AGES: Its problems and legacies. By J. D. GRIFFITH DAVIES and F. R. WORTS. *London: Alfred Knopf* 1928. 9×6 *inches;* xiii+298 *pages; illustrations and sketch-maps.* 6*s*

The intention of this book, the first of the Bridgehead Series, is to provide a link between the ordinary school text-book and those works which an advanced student is required to master. The student will realize that history is not merely a list of dates of political events, for there are essays on most aspects of mediæval English life, for example on the Church, chivalry, education, and art. The authors have striven to avoid taking sides and summarize fairly the diverse views on this controversial period. To take, as they do, the Norman Conquest as a starting-point is however at least arguable. Many of the characteristics of English life were rooted in the preceding centuries, as indeed appears in the course of this book: moreover this division allots too much weight to the Norman contribution to English civilization. Proportion in this type of work is hard to achieve: yet, when it is considered that the great mass of the population were neither great lay nor ecclesiastical dignitaries, one is not altogether unjustified in expecting more attention to be given to the humbler classes of town and countryside. It is particularly noticeable that no essay deals with the towns, civic organization, nor trade. This lack partly explains why the book has no special geographical interest. The authors are enthusiasts for their subject: this is not of itself to be deplored except when, as here, it sometimes leads to too confident generalizations. This enthusiasm will at least send readers the more readily to the standard works quoted. The illustrations, chiefly architectural, are very good.

G. R. C.

SUSSEX. By S. E. WINBOLT. Bell's Pocket Guides of English Counties. *London: George Bell & Sons* 1928. 7×4 *inches;* xxxvi+252 *pages; illustrations by E. and W. Ward.* 6*s*

This little book reflects credit alike on the author, the illustrators, and the publishers. Mr. Winbolt not only knows well the past and present of the county in which he has so long resided, but evidently delights in it. As a result the reader can hardly help feeling that he is being taken by a companion to the most interesting places and points of view in the county, his attention being called, on the way, to its antiquities, architecture, history, and scenery. Although so small a volume cannot profess to be an exhaustive guide, yet it is remarkable what a large and varied amount of information it contains. A striking feature of the

book is the series of illustrations by Mr. and Mrs. Ward. There are no less than sixty-four full-page photographs, and it may safely be said that no county guide has ever before been more admirably and beautifully illustrated. The technical skill and artistic taste shown by the photographers are beyond praise. Whether it be an extensive view over the Downs, the sea-coast, a church, a castle, or a cottage, there are always the same clarity and artistic choice, which cannot fail to interest and charm the reader. And he will find himself involuntarily agreeing with the concluding remarks of the author's Introduction that Sussex "teems with interest . . . is a county of lovely landscapes and seascapes, of picturesque villages and ancient buildings, and those who explore it will be deeply impressed with the complex charm of this corner of Old England." The map of the county supplied in two parts, east and west, is adequate, and shows clearly the position of all the places referred to in the text. E. A. P.

OUR OWN ISLAND : A descriptive account of Guernsey. By J. P. WARREN. *St. Peter Port: Guernsey Press Co.* 1927. 10×8 *inches;* 126 *pages; maps, diagrams, and illustrations.* 7*s* 6*d*

This book is a geographical study of the Island of Guernsey. In a series of chapters entitled the Air, the Sea, the Land, the People, Traffic ways, and How we are governed, the Climate, Relief, Products and Occupations, the Roads, and the system of Home Rule existing in the island are described. Special interest attaches to the Cattle Industry (the Guernsey cow has been most carefully protected from disease by stringent regulations regarding the importation of other stock) and the development of what is known as the Growing Industry, now chiefly concentrated on the cultivation of the tomato, the most valuable product of Guernsey. In 1924 the quantity exported amounted to 21,000 tons. A corollary of this export was the importation during the same period of 68,000 tons of anthracite for heating the glass houses which now form such a striking feature on the island. An interesting sketch of the government of the island, in which the local franchises and liberties existing from Norman times, and ratified by John and subsequent kings, have always been recognized, explains the peculiar manner in which Guernsey is governed, which "cannot be paralleled anywhere in the world, except near at hand in Jersey." In conclusion a brief summary is given of the ten parishes into which the island is divided. A number of outline maps show the Relief of the Land, the Distribution of Rainfall, Streams, Grassland, Uncultivated Land, Grain, Cattle, the Growing Industry, and Roads, and there is a detailed plan of the capital, Saint Peter Port. There are also several photographs of scenery. Some of these unfortunately are not as good as they might be, considering the present state of photography. Mr. Warren has compiled a clear and useful work, and it is published in the island at a very reasonable price. E. A. P.

CHESHIRE. By R. WELLDON FINN. With an Introduction by the Very Reverend F. S. M. Bennett, Dean of Chester. *London: Alfred A. Knopf* 1928. 7×5 *inches;* viii+116 *pages; illustrations, diagrams, and maps.* 3*s* 6*d*

This is one of the Borzoi County Histories series, under the editorship of S. J. Madge. It is an intimate and interesting account of one of England's most attractive counties, and at the same time a compendium of exact information, in which a critical examination has revealed no inaccuracies. Mr. Finn acknowledges his indebtedness to Dr. Ormerod and other authorities on the county, but his little book is much more than a hash of other men's labour. Obviously he knows Cheshire as well as he loves it, and this knowledge has enabled him to practise unerring selection and so make his work just what a book of this kind

should be. Within his limits his range has been comprehensive, for after a geographical and geological survey he takes us through Cheshire's history from prehistoric times to the present day. The book is well and aptly illustrated by photographs, drawings in line (by Mr. H. Wren), and several useful maps while a glossary of place and family names and an index are added. O. R.

THE CAIRNGORMS. By HENRY ALEXANDER. (Scottish Mountaineering Club Guide, Volume 2, Section A.) *Edinburgh: Scottish Mountaineering Club* 1928. 9×6 *inches;* viii+218 *pages; illustrations and map.* 7*s* 6*d*

The latest volume of the S.M.C. Guide is fully up to the high standard of those which have been already noticed in the *Journal*. In the Introduction—one of the most interesting sections in the present book—it is pointed out that, although the title 'Cairngorms' is used as designating the great central and dominating group of the region with which the volume deals, strictly speaking "Grampians" would have been more correct, since that is the name of the well-marked range which crosses Scotland from south-west to north-east. The term "Grampian," however, though well recognized in maps, and enjoying a certain literary usage, has never passed into popular favour. "Cairn Gorm" was originally the name of a single summit (and that not the highest of the group); but after first being extended in the plural form to that group as a whole, it is now becoming more and more widely used as descriptive of the whole region.

Interesting notes are given on the Fauna, Flora, Geology, etc., of the region, which, roughly, comprises the lofty group of mountains between the Dee and the Spey; and there is also an excellent Bibliography. The author points out that, though this group does not include the highest peak in the British Isles, still, as Ben Macdhui, the second highest, and three other distinct summits over 4000 feet are to be found in it, the group as a whole may properly be said to form the largest group of high hills in the country.

Among the various districts described are those of Ballater, Braemar, and the fine ridge of Lochnagar, the last being the subject of several of the most striking illustrations in the book.

It need hardly be mentioned that there is the usual full and comprehensive information as to the many expeditions which may be made in the country described, and that it is marked by the clearness and accuracy which we can always count upon finding in the volumes issued by the club responsible for them. Perhaps one of the most attractive features of the work is the artistic and beautifully reproduced picture that forms its frontispiece, "Glen Derry, the Path to Ben Macdhui." W. W.

ROUND ABOUT ANDORRA. By BERNARD NEWMAN. *London: George Allen & Unwin* 1928. 9×6 *inches;* 300 *pages; illustrations by C. Henley Gardener, and a map.* 12*s* 6*d*

The tiny independent republic of Andorra (about the size of the Isle of Wight) is certainly one of the least known of European States. Perched in the wildest mountains of the Pyrenean chain and with a mean altitude of over 6000 feet, it has few attractions for the ordinary traveller, for its monuments and pictures can be exhausted in twenty minutes, it has no cities and few roads, its accommodation is bad, its scenery is no better than that of other Pyrenean valleys, while its villages, although quaint, are no quainter than a thousand others reached with far less difficulty. Yet it has an attraction of its own, as most people who read Mr. Bernard Newman's timely and lively account of it will admit. Its history is unique. Mr. Newman claims that it is the only country in the world which has lived under exactly the same form of government for a

thousand years; change is almost unknown to the 6000 Catalans who make up its population, and the little State is mediæval in all its essentials.

Mr. Newman gives a readable account of Andorra's history, showing that the country has preserved its independence chiefly because it has had both Spain and France as nominal overlords and neither would permit annexation by the other; and it will come as a surprise to most readers that, but for the sturdy spirit of the people, Andorra would have become a fashionable gaming centre in 1880, when a French syndicate, seeking a site where gambling might be carried on without interference by the rigorous laws of a powerful State, attempted to "open up" Andorra and went to Monaco only when the Andorrans had refused to countenance the scheme.

The greater part of Mr. Newman's book is taken up with a description of Andorra, its surroundings, and its people as they are to-day. His last chapter contains some practical advice to the intending visitor, giving itineraries to suit both pedestrians and motorists, and shows that, for the man of slender purse, a fortnight's tour need not cost more than £20. Mr. Henley Gardener's illustrations add charm to the book, which is accompanied by a sketch-map and an index. Mr. Newman mentions that a new map of Andorra, published by the Librarie Dardel of Chambéry, may be obtained in England from Messrs. Stanford. O. R.

TURKESTAN DOWN TO THE MONGOL INVASION. By W. BARTHOLD. Second edition. Translated from the original Russian and revised by the author with the assistance of H. A. R. Gibb, M.A. (E. J. W. Gibb Memorial Series, N.S. 5.) *London: Luzac & Co.* 1928. 10×6 *inches;* xx+514 *pages, and a map.* 25*s*

Professor W. Barthold has done more than any other scholar past or present to turn to account the Arabic and Persian sources dealing with history and geography of Central Asia. He has always been an indefatigable worker, as is shown by the fact that since 1892, when he published his first article, he has produced nearly 300 books and pamphlets, all of them bearing the stamp of his accurate scholarship. His researches have always been concentrated on the mediæval history of the Middle East, and his learning is based not only on an unsurpassed acquaintance with Muslim literature, but also on first-hand knowledge of the topography and archæology of the countries in question. That the great services he has rendered to science are not fully appreciated in this country is no doubt due to the fact that most of his work has appeared only in Russian. The appearance of a second edition of his great work on Turkistan in English is therefore an event of special importance to us: for in it are summarized most of the precious data this Russian scholar has accumulated during the past thirty years. For the translation, most admirably executed by H. A. R. Gibb, has been controlled by the author throughout, and the subject-matter, the notes and the bibliography have been entirely brought up to date.

Space will not permit the contents of this *magnum opus* to be described in any detail here. Suffice it to say that as far as regards both history and geography it supersedes all other works on the subject, and that it must for all time hold its own as the standard authority on Turkistan and the neighbouring countries from the time when those regions first enter the arena of Muslim history down to the arrival on the scene of the devastating hordes of Chingiz Khan in the thirteenth century. Apart from this Barthold is the first scholar who has described the social and economic conditions prevailing in Middle Asia in the Middle Ages. Over one hundred pages of this work are devoted to the reconstruction of the topography of Transoxiana, based on a critical examination of the known

materials. It would be surprising to learn that he has ignored any single work in any language which throws light on his subject.

It is by great good fortune that so many of the ancient Arabic works on geography have been preserved to us, though many others known to us by name still await discovery. In quite recent years one or two of the most important have been brought to light. Barthold has pieced together all the information obtainable from these old works and has been able to give us a comprehensive survey of the most important towns and of the main routes connecting important provinces and cities. It is interesting to recall that it was Barthold who first conclusively proved, partly by the study of new sources and partly by the re-examination of known texts that during the thirteenth to sixteenth centuries the Amu Darya actually flowed into the Caspian, former scholars having maintained that it could only have done so, if at all, in mythical times.

The value of the bibliography cannot be overestimated, for it includes many Russian works which are little known in this country. The index is in keeping with the high standard set by the book itself. E. D. R.

THE CULT OF THE PEACOCK ANGEL: A short account of the Yezîdî Tribes of Kurdistan. By R. H. W. EMPSON, with a Commentary by Sir RICHARD TEMPLE. *London: Witherby* 1928. 9×6 *inches; 236 pages; plan and illustrations.* 15*s*

The Yezîdî Tribes, now reduced to some 40,000 by the massacring Turks, live for the most part in the vilayet of Mosul and the foothills of the mountains of Kurdistan. They have attracted attention by the mystery of their origin, and especially by their religion, which, based on the propitiation of evil, has gained for them the name of Devil-worshippers. The name of Satan being forbidden utterance, a symbol was chosen which could not possibly be confounded with it. This symbol was a peacock, and Satan became Melak Tâ'ûs, or the Angel Peacock. The Yezîdîs declare that the image of the angel is a symbol and not an idol of their faith. The images are taken round by travelling Qauwâls (priests), and exhibited to the faithful with certain ceremonies. They hold in highest reverence a saint, Sheikh 'Adi, and a shrine of the same name is their Mecca where their chief festivals take place. This shrine—tucked away in a valley in the mountains of Kurdistan, and referred to by Mr. Empson as the nearest approach to our conception of an earthly paradise—was visited by him, and he gives a full description of it with a plan. Their religion is a strange medley showing traces of the teachings of Zoroaster, Manes, Christianity, and Islam. Mr. Empson remarks that it is difficult to imagine how such a strange compound inspires the Yezîdîs with fortitude in face of oppression, but the smallness of the population is in no small measure due to the fact that they are nearly all martyrs to the cause. The two big Turkish massacres of 1845 and 1892 would have put an end to a sect less strongly imbued with the essential spirit of unity.

The author is fortunate in being able to append to his work a commentary upon it by Sir Richard Temple, who, with his great knowledge of the religions of the East, is able to throw some light on that of the Yezîdîs. In his view the basis of their religion is Islamic, with a large admixture of other faiths with which they have come in contact, *e.g.* aboriginal Paganism, Nestorian Christianity, and Zoroastrianism. This, he adds, is really the history of almost any heterodox Islamic sect one may mention. The Muhammadan nature of the whole legend of Melak Tâ'ûs comes out in the dedication of the image. The influence of Islam is overwhelming in their religious ideas. They are really extremists (*Ghulât*) of the Shi'a Moslem sect. E. A. P.

THE DEVELOPMENT OF INDIAN AGRICULTURE. By ALBERT HOWARD, C.I.E., and GABRIELLE L. C. HOWARD. ('India of To-day,' Vol. VIII.) *London: Humphrey Milford, Oxford University Press* 1927. 7×5 *inches;* iii+98 *pages, and illustrations.* 3*s* 6*d*

The uplift of rural India, where 90 per cent. of the population, living in half a million villages, are directly or indirectly dependent upon the soil, is the central problem for Indian Statesmen. That this was so was fully realized by Lord Curzon, who initiated scientific investigation into the problems of Indian agriculture; and the results so far attained are, as Lord Ronaldshay says in his 'Life,' "the fruit produced by the tree Lord Curzon planted."

This little book states clearly the conditions of the problem, what has been done towards its solution, and what remains to be done; and the lately published Report of the Royal Commission on Agriculture in India supports almost entirely the conclusions arrived at by the authors. Some success, taking the line of least resistance, has been achieved in getting the Indian cultivator to improve his crops of cotton, wheat, rice, sugar-cane, jute, tobacco, ground nut, and fodder plants, by using seed of better yielding varieties so as to increase production without extra expense. But the progress is slow. The chief obstacles to rural uplift are the indifference and illiteracy of the cultivator, his chronic indebtedness, and a mentality enslaved by superstition. Nowhere have the people come forward themselves or through their representatives in the Councils to urge practical steps for agricultural improvement. Obviously the key to the situation is education, and excellent suggestions are made as to this by the authors. The policy which has been adopted in the Malay peninsula is equally suited to India: to give the peasants as good an education as can be given in their own language, an education that will not tempt the people away from the land, but will make the son of the farmer a more intelligent farmer than his father has been. Until this has been achieved adult education that shall be practical, accessible, and attractive is of urgent importance. W. H. A. W.

SIAM AND CAMBODIA IN PEN AND PASTEL: With Excursions into China and Burma. By RACHEL WHEATCROFT. *London: Constable & Co.* 1928. 9×6 *inches;* x+296 *pages; illustrations and a map.* 21*s*

Having spent two years painting in Ceylon, Miss Wheatcroft decided to go farther east. Apart from a visit to Siam, she tells us that the three places on which her heart was set were Borobudur in Java, the Great Wall of China (from Peking), and Angkor. She tells us little of Java, but she saw a good deal more of China than Peking and went up the Yangtze to Chungking; she gives us some pleasant descriptions of Cambodia, whence she made her way to Siam, going as far north as Chiengmai and then on to Burma and up the Irrawaddy to Bhamo. She travelled leisurely, painting and sketching as she went (as she puts it, each stage was to furnish the wherewithal for the next), and travelled not on the tourists' track but where fancy took her. In this way she was able to catch the spirit of the countries she visited, and though she suggests that her book is merely supplementary to her pictures, it is a lively record and makes easy reading, while the illustrations—from pen-and-ink sketches of elephants to beautiful pictures in colour of such scenes as Angkor Wat at dawn—give it distinction. A word of praise is also due to the publishers, who have had the foresight to include exactly the right kind of map to supplement such a volume as this, with clearly printed place-names and opening from a fly so that one may keep it before one as one reads. O. R.

LA CROISIÈRE NOIRE: Expédition Citroën Centre Afrique. By GEORGES-MARIE HAARDT and LOUIS AUDOUIN-DUBREUIL. *Paris: Librarie Plon* 1927. 12×10 *inches;* viii+262 *pages; maps and illustrations*

The enterprising head of the Citroën Company conceived the idea that if he fitted a fleet of motor cars as "caterpillars" instead of adopting the more usual and deservedly popular round wheels, the vehicles could with impunity overcome deep wadis, sand-dunes, and other obstacles with which African travellers are confronted, and which would otherwise have to be avoided. A big expedition was organized for the traverse of the continent, and the command entrusted to MM. Haardt and Audouin-Dubreuil, the party including various other Europeans. This book is a record of their adventures. They seem to have had a very good time. The photographs are excellent, and many of them show the cars in the trying situations for which Africa provided abundant opportunities; the frontispiece, too, a drawing by M. Jacovlef, is an entertaining piece of work. Several passages in the narrative are spirited and show a sense of humour. There are two editions, one of a price and appearance to tempt the casual purchaser, the other a "de luxe" edition, for the purpose of presentation. The inner wrapper of the copy sent to the Society consists of a reproduction of Delisle's map of Northern Africa, cut to the necessary shape. It no doubt has some decorative value, but many would have preferred to have the map complete and protected against damage by insertion within the volume. The supplementary portfolio of coloured reproductions of M. Jacovlef's paintings is the most valuable part of the work: the paintings (which some would perhaps consider a little "modern") are masterpieces of design and colour. The artist has real imagination and sense of form which Mr. Citroën cannot be too highly complimented for allowing a free rein and presenting to the world in such admirable shape.

An English version has since been published in this country in a less imposing format (London: Geoffrey Bles, 1928, price 16*s*). F. R. R.

WAYFARING IN AFRICA. By DAISY M. CHOWN. *London: Heath Cranton Ltd.* 1927. 9×6 *inches;* 224 *pages; sketch-map and illustrations.* 10*s* 6*d*

Miss Chown went from Cape Town to Beira by train, from Beira to Mombasa in a steamer, and thence again by train to Lake Victoria. She crossed Lake Victoria, walked to Lake Albert, and travelled down the Nile by steamer, motor car, and train. In the course of her journey she saw many "natives." Her interest in her surroundings is appropriately expressed with the help of the usual clichés: the sleeping-cars for the most part had four bunks in each compartment, the insects were troublesome, the eminences were lofty, the foreign foodstuffs were fearsome, and the bazaars were full of Eastern curios. There are, however, one or two gems. Miss Chown refers to an inn named "the White Rhino, and thereby hangs a tale, which unfortunately I have now forgotten." It is also pleasant to be allowed to share the author's ecstasy for "the Pylons and sculptures of Ancient Egypt, older than the Pharaohs and almost beyond the ken of history." If a criticism may be ventured, such orthographic horrors as Poinsetta, Bourgainvillea, Cullinean, and Madhi should have been eliminated by the publishers if by no one else, though the author deserves gratitude for coining the word "tawdy" as an epithet for bead ornaments. P. M. R. R.

DESERTS IDLE. By MICHAEL H. MASON. *London: Hodder & Stoughton* 1928. 10×6 *inches;* xii+212 *pages; illustrations and a map.* 20*s*

This volume is an account of the author's journeyings through Southern Sudan, Uganda, and Kenya, whither he was beguiled on his way to Tanganyika

Territory to search for minerals. His experiences do not appear to have differed much from those of other European travellers in East Africa who have the leisure to wander off the well-beaten tracks. Most of what he has to tell us about the country, its natural features, climate, its indigenous and alien populations, its flora and fauna, has already been told. Occasionally, as when he describes the customs of certain tribes, his accounts are so at variance with those of acknowledged authorities that we are led to concude either that he must have imperfectly understood his informants, or that he must be very easily gulled. When we read of large harems acquired by Acholi chiefs through wholesale poisoning of husbands or of men buried alive at the funeral of a king of Bunyoro, we wonder that it did not occur to him to ask how British administrators, charged with the duty of protecting the Uganda peoples, could permit such practices and still retain their posts.

Gullibility is not the author's only fault. Information casually collected about important centres like Jinja, Nairobi, Moshi, Arusha, and Dar-es-Salaam is written down with so positive an air of authenticity that many readers would be misled into regarding it as typical of the real state of things. Any other visitor, however, would probably find it difficult to encounter in the course of weeks so many undesirable people in the places mentioned as the author met in a few hours. Neither what happened at Sekenke gold-mine nor his giving an account of it reflects any credit on himself. And it is not edifying to read of his treatment of his native carriers. Most of his trekking was done through well-explored country and among friendly peoples who enjoy British protection. What would have happened to him had the journeys been made among turbulent and unfriendly tribes must be a matter of conjecture.

The author appears to regard his book as a real contribution to our knowledge of Tropical Africa, else he would not have supplied the information about volcanoes, the Rift Valley, the languages of various tribes, and kit, which is contained in his three appendices. But there are too many defects in the volume to justify it being recommended to the serious attention of geographers.

A. G. C.

PLACE-NAMES OF ALBERTA. Published for the Geographic Board by the Department of the Interior. *Ottawa: F. A. Acland* 1928. 10×6 *inches; 138 pages; and a map.* 25*c*

The name Alberta was given about 1882 by the Governor-General, the Marquess of Lorne, in honour of his wife, H.R.H. Princess Louise Caroline Alberta, whose better-known name is perpetuated in Lake Louise. That was shortly before the C.P.R. reached Alberta and names began to be showered on the map "not wisely but too well." Some of the old Indian names, mostly Cree and Blackfoot, remain, but many have been translated into English. It is perhaps an advantage to call a hill Antler when the Indian name is as unmanageable as *was-ka-suk-is-kun ka-so-pit*, Cree for "the pile of elk-horns"; but the Blackfoot *Mokowanis* and *Saamis* have scarcely been improved by translation into Belly and Medicine Hat (*i.e.* "headdress of a medicine-man"). Athabasca is Cree for "the place of reeds"; Assiniboine, the name of the Stoney Indians, signifies "those who cook by placing hot stones in water"; and Saskatchewan is a corruption of the Cree *kis-is-ska-tche-wan*, meaning "swift current."

The most striking feature about the non-indian names is the extremely inadequate reason for many of them. Edmonton was originally a fort built in 1795 by a member of the Hudson Bay Company, who probably named it in compliment to his clerk, a native of Edmonton, Middlesex. Calgary was named in 1876 by Col. J. F. Macleod after the ancestral estate of his cousins in Mull,

which he had recently visited. But the bestowal of such appellations seems amply justified in comparison with the naming of C.P.R. stations, Caruso after the famous singer and Antonio after the " Merchant of Venice." Even these are preferable to a horrible hybrid like Benalto, meaning "high hill," and some of the portmanteau names like Bertawan on the borders of Alberta and Saskatchewan. Hemaruka is an ingenious combination of the names of four sisters, Helen, Margaret, Ruth, Kathleen, but will probably be credited with an Indian origin when these ladies are forgotten.

As in the other lists issued by the Geographic Board of Canada there are no aids to pronunciation; Indian words are liable to be wrongly accented by strangers, who would be glad of help also with some of the other names. There is a note by the Chairman of the P.C.G.N. saying that he heard Gleichen, which was named after his father, pronounced *Gleechen* (*i.e.* to rhyme with *beechen*). Are the Russian names Slawa and Wostok, unfortunately spelt with *ws*, pronounced after the English style? J. H. R.

THE VOYAGE OF CAPTAIN THOMAS JAMES FOR THE DISCOVERY of the North-West Passage, 1631. By Commander R. B. BODILLY, R.N. *London: J. M. Dent & Sons* 1928. 8×5 *inches;* 216 *pages; and a sketch-map.* 6*s*

The naval officer who edits this partial transcript of Captain James's voyage of 1631 gives the reader no information as to the text he has used. It is evident, however, that he has not seen the original account written by the explorer himself, which appeared in 1633, under the title 'The Strange and Dangerous Voyage of Captaine Thomas James in his intended Discovery of the Northwest Passage into the South Sea.' This rare volume, with its important "Appendix concerning Longitude, by Master Henry Gellibrand, Astronomy Reader of Gresham College of London," and its careful list of the instruments taken (some by Master Gunther), would have been worth reprinting. What Commander Bodilly has given us, however, is merely a copy of the paraphrase to be found in the 1744–8 edition of John Harris's 'Voyages and Travels.' This paraphrase differs slightly from that found in the 1705 edition of Harris, and was very carelessly prepared. The language and spelling of the seventeenth century were, of course, "modernized" to suit eighteenth-century readers, but in many cases the entire sense of the original was destroyed. On p. 209, l. 4, for example, "I . . . have travelled *with* diverse honourable and learned Personages of this Kingdom, for their Instructions," should read "I . . . travelled *unto* divers," etc. On p. 187, "latitude 55°" should be "lat. 55° 30′"; on p. 195, "58° 36′" should be "59° 30′"; S.W. is copied as S.E., "the bare hill" as "Bar-Hill," and so on. In the new reprint the text as found in Harris has been cut up into paragraphs, which alternate with paragraphs by the editor: the latter are as a rule merely a fresh paraphrase, or a simple running commentary on the text, no critical discussion being attempted. Such discussion, indeed, would be useless, owing to the corruption of the text employed. To the original narrative Captain James appended the detailed tables of his readings for the declination of the compass; and Mr. Gellibrand's appendix gives the detail of the determination of the longitude of Charlton Island, where James wintered, and where an expected eclipse of the moon was observed on October 29, a similar observation being made at Gresham College in London. A modern navigator's critical review of data such as these would be very welcome, and it is to be regretted that Commander Bodilly and his publisher did not take the very little further trouble necessary to make the book a scholarly re-issue of the authentic text. As it is, it is merely a good sailor's yarn. E. G. R. T.

THE EARTH'S CRUST, ITS SURFACE FORMS, AND ISOSTATIC ADJUSTMENT. By FRIDTJOF NANSEN. (Avhandlingar utgitt av Det Norske Vetenskaps-Akademi i Oslo. I. Mat.-Naturv. Klasse, 1927, No. 12.) *Oslo:* 1928. 9×6 *inches;* 122 *pages;* 17 *text-figures*

A large part of the land area of the globe—in Europe as much as 57 per cent.—forms low flat plains less than 200 metres above the sea, sloping gently seawards and, as a rule, continued beyond the coast as broad flat platforms slightly below sea-level. In Dr. Nansen's opinion the existence of these plains proves that through long geological ages the continents have been worn down by denudation towards a sea-level which has in general been very near to the present one. There have been oscillations, but after each temporary departure there has been a return to the normal level.

Dr. Nansen finds the explanation of this general tendency in isostasy. His isostasy is like that of Airy, and he assumes that the continents are masses of lighter rock floating in a denser substratum. He discusses previous estimates of the thickness of this continental crust and concludes that the most probable value lies between 30 and 50 kilometres; but he places his plastic layer at a somewhat greater depth, and thinks that beneath the continents it may lie 50 or 60 kilometres below the surface. Under the oceans, on account of the low temperature of the ocean floor, the plastic zone is lower, perhaps at a depth of 70 or 80 kilometres. For the same reason he thinks that the rigid crust beneath the ocean is probably considerably thicker than the average continental crust and has a higher rigidity.

The greater part of the memoir is devoted to a discussion of the Quaternary oscillations of level in Fennoscandia. Dr. Nansen thinks that these may be completely accounted for by isostatic adjustments of the land-mass due to the growth and decay of the ice-sheet, together with changes in the level of the sea due chiefly to variations in the amount of water locked up as ice upon the land. The idea is by no means new. It was foreshadowed by Jamieson as long ago as 1865, and has since been developed with great success by both Scandinavian and American geologists. Dr. Nansen particularly stresses the completeness of the isostatic adjustment and the rapidity with which it takes place. The strand-flat of Norway, a wave-cut platform about 10 metres above the present sea-level, was formed before the last glacial period a little below the level of the sea at the time. Under the weight of the ice the land sank, the extent of the depression varying with the thickness of the ice-covering. On the western coast, where the ice was thin, the depression was slight; in the inner part of the Sogne Fjord it amounted to 120 or 150 metres. But the level of the strand-flat is now nearly constant, the local variation being not more than a few metres. Dr. Nansen's point is that this flat was formed everywhere at the same level; during the last glacial period it was very unequally depressed; but everywhere, when the ice melted, it returned nearly to its original level. The rise of 10 metres is probably due to the removal of material from the land by erosion beneath the ice-sheet.

There can be no doubt that in Scandinavia the Quaternary oscillations of level find a very simple and complete explanation in isostasy. But it is different in England. Borings in widely separated areas have proved the existence of buried valleys filled with boulder clay and reaching a couple of hundred feet below the present sea-level. Before the boulder clay was deposited the land must have stood much higher than it does now, and with the melting of the ice it has not returned to its former level.

From the facts that he brings forward Dr. Nansen concludes that any departures from a condition of isostasy are almost completely re-adjusted in a remarkably short time; and in the light of this conclusion he proceeds, in the

last thirty pages of the memoir, to consider the formation and destruction of mountains, upheaval of peneplains, oceanic transgressions, and other general questions. P. L.

ENGLANDS WELTHERRSCHAFT. By ALFRED HETTNER. 4. Auflage. *Leipzig: B. G. Treubner* 1928. 9×6 *inches;* vi+219 *pages. M.*9

This book was first published during the war under the title 'Englands Weltherrschaft und der Kreig.' It still bears some signs of its origins, but it is written in a spirit of stark realism, though not always successful in avoiding prejudices. These, however, are sufficiently obvious to be easily discounted. and do not affect its value. It has evidently exerted considerable influence in Germany, as several books have recently appeared enlarging upon portions of its theme. It treats concisely the geography of the British Isles mainly in its geographical bearing, the beginnings and growth of British power overseas, the economic and constitutional basis of the Commonwealth to-day, its relations with other powers, and its future prospects. The first sections cover ground which has become increasingly familiar since the appearance of Mackinder's 'Britain and the British Seas.' As might be expected, Dr. Hettner emphasizes strongly the Teutonic elements in early English history, and the bonds uniting England with Europe. The following sections are an elaboration of the supreme part played by sea-power in British colonial expansion. This, also, is universally recognized now, but Hettner develops its influence in spheres other than the political, particularly in creating a power outside the actual bounds of the Empire, a power difficult to assess, but nevertheless of great weight in world affairs. This power rests upon Anglo-Saxon culture, in part diffused through control of the sea. The underlying thesis, ably developed, is that Britain's world position to-day is not the outcome of special favour of Providence—which the author thinks is the Englishman's creed—but of a particular set of geographical conditions operating at one definite time. These conditions are not eternal, and in the present juncture their values are changing. With the development of modern transport, for example, a continental port has a greatly enlarged sphere of economic influence, to the detriment of previously favoured "insular" ports. Modern industrial developments are also creating new and powerful rivals to Britain, who is not utilizing science in the struggle—an arguable point. As these islands are the core of the Empire, such changes must re-act upon its position, making it less possible than formerly to "cut adrift" from Europe.

Much space is also given to an analysis of national character and political aims. This in the main, but not entirely, follows conventional lines—self-conceit, "the white man's burden," and so forth; but it is not necessary to discuss this subject here. Many of the author's statements are demonstrably incorrect. On the whole, however, he shows a keen appreciation of the nature of the Commonwealth, and of its recent developments. G. R. C.

LAND TENURE AND AGRICULTURAL PRODUCTION IN THE TROPICS. By H. MARTIN LEAKE, SC.D. *Cambridge: W. Heffer & Sons Ltd.* 1927. 9×6 *inches;* x+140 *pages; and illustrations.* 7*s* 6*d*

This volume is an authoritative and scholarly review of the land systems of India, with which the author is most familiar, and which he commends to the serious study of all those interested in the development of the British Empire as a whole. Dr. Leake re-emphasizes the fact that agriculture is the basic industry of the Empire. Its progress is dependent upon the security of the producer on the land and the further guarantee of material rewards for his labour consonant with the rewards to be obtained in other occupations. This condition can obtain

only where the direct producer is safeguarded against unfair exploitation by the system of land tenure in force. It demands the greatest vigilance on the part of Governments. Dr. Leake contends that the land tax levied in India, the assessment of which is subject to periodic revision by the central government, acts as a deterrent to land speculators and enables an equitable economic balance to be arrived at between the tenant farmer, the landlord, and the Government. He is conscious of its limitations, however, and points out the various ways in which this balance has been upset by the landlords, and suggests remedies applicable to the present situation in India and the safeguards which must be devised if history is not to repeat itself in other tropical parts of the world.

Governments, in return for the taxes levied on the land, must guarantee the producer security against aggression and dispossession, must provide the necessary transport and market facilities for the disposal of surplus produce, supply capital for agricultural improvements or foster cooperative enterprise among the producers, and adequately provide them with all those services having for their object the improvement of the conditions of life of the agricultural community as a whole. The primary aim of the education services should be, Dr. Leake considers, to promote the material development of the masses most rapidly. To further this object he urges that the education system should be adapted to fit individuals for the occupation most commonly practised. So far this has not been the practice in India, where education of the literary type has had the effect of divorcing the leaders of the community from the land.

Dr. Leake states the case for agricultural education succinctly and convincingly. His book can be warmly commended to the attention of all those interested in the subject of agricultural development, not only in the tropics but in every other part of the world. A. G. C.

THREE JOURNEYS. By Viscountess Cave. *London: Thornton Butterworth* 1928. 9×6 *inches;* xv+271 *pages; and illustrations.* 15*s*

Visits to East Africa in 1901, South Africa in 1919, and Canada and New York in 1927, all in company with her husband, provided Lady Cave with the subject-matter for this volume. Her experiences are recounted mainly in diary form, a method which certainly saves the author a good deal of trouble, but usually at the expense of the sustained interest and patience of the average reader.

Lady Cave displays her talent to the best advantage in descriptive passages. Her word-pictures, ranging over the scenery of Zanzibar and Kenya, the veldt and coastal regions of South Africa, the outstanding beauty spots she visited in America and Rhodesia, her second-hand but vivid impressions of historic figures such as Paul Kruger, Cecil Rhodes, and Lobengula, and the pen-portrait of the beautiful Mrs. Herbert Stanley (now Lady Stanley), are all very well done. With consummate skill and the love of an artist she presents the varied hues and scents of the flora of the three countries in which she journeyed. She is equally happy in describing the processes involved in the extraction of gold from obdurate quartz.

So high a level of excellence is attained in such features that it is a pity the volume is marred in places by gossipy trivialities. A. G. C.

MOUNTAINEERING VENTURES. By Claude E. Benson. *London: T. C. & E. C. Jack, Ltd.* [1928]. 8×6 *inches;* 224 *pages;* 17 *illustrations.* 6*s*

This, the fifth volume in the "Real Adventure Series," is a collection of notable climbing feats (mostly by pioneers) described in a popular style for the benefit of the man on the pavement. Nine of the chapters are occupied with the Alps; one each is devoted to Ushba in the Caucasus, Paglia Orba in Corsica, the Store

Skagastölstind in Norway, Aorangi in New Zealand, and, finally, the thrice-assaulted Everest. There is naturally not much geography in the book. The stand for the name Aorangi deserves a word of commendation; but the abolition of Mount before Everest will not find favour with this Society.

A small point of a purely technical nature may interest climbers. The author is somewhat severe on Slingsby's two companions on the Store Skagastölstind in 1876 for wearing boots without nails "on principle." One of the two well-known guides in the Horungtinder told the reviewer this year that he had been up "Storen" over sixty times in his life, and had never had nails in his boots.

THE LIFE OF LORD CURZON: being the authorized biography of George Nathaniel, Marquess Curzon of Kedleston, K.G. By the EARL OF RONALDSHAY. Volumes 2 and 3. *London: Ernest Benn, Ltd.* 1928. 9×6 *inches;* 424 *and* 458 *pages; illustrations.* 21*s each volume*

We take leave to congratulate our former President, Lord Ronaldshay, on the triumphant conclusion of the great task he undertook in the biography of his great predecessor in the Society's chair. The first of his three volumes, covering the years before Lord Curzon's viceroyalty, has already been noticed in the *Journal*. The second volume deals with the Viceroy in the fullness of his powers, at the culmination of his early ambitions, supremely confident in the greatness of the British destiny in India, and in his own peculiar fitness for the task, won by long years of arduous travel and intense study. In the third volume, which is in many ways the most interesting and, if we may say so, the most skilful, we have sympathetic treatment of the nemesis of his home-coming, to find himself denied for years any place in political life, and driven, to the great benefit of the University of Oxford and of our Society, to divert his enthusiasms into other channels. Then came the great war which found but half-completed his schemes for that full establishment of the Society in Kensington Gore which we are only now able to realize, but now upon an even greater scale. The letters and memoranda in this third volume must be of lasting value for the political history of the war, and a precious possession to the student of dialectic. But the whole book will have a wider and more permanent interest as a penetrating study of a complex and remarkable character, exalted yet with curious trivialities which there is the less need to gloss over because their possessor seemed to take a special pride in exhibiting them in his own volumes of reminiscences. One side only of that many-sided character we seem, perhaps, to miss in the biography: a peculiar force of words in conference or interview, whose memory recalls the phrase used by Mr. Arthur Benson of Dr. Warre, a "kind of secret power in him." That there was in Lord Curzon something of the same quality, not quite human, must be felt by many who had the formidable privilege of serving him. Lord Ronaldshay has marshalled his matter with great skill to explain just how it came about that he never had in English public life quite the influence that his talents and industry should have won him. These three handsome volumes, with their finely set and beautifully printed pages, will be a permanent source of instruction for students of public affairs, and will, we think, come to be reckoned among the few great biographies of our time.

THE MONTHLY RECORD

NEW AQUEDUCT FOR ROME

A short note by Sig. E. Grupelli in *L'Universo* records the decision to construct a large aqueduct for the water supply of Rome, the necessary surveys having been already carried out. The water will be drawn from the sources of the Peschiera, in the Apennines near Concerviano, to the extent of 4 cubic metres per second. The feature of the scheme is the proposal to conduct the water to Rome by underground galleries, rivers being crossed by siphons or carefully concealed bridges, with the object apparently of securing it from hostile attack. The elliptically shaped tunnels will be at an average depth of 20 metres. At Salisano, a subterranean hydro-electrical works is to be installed, capable of developing 10,000 h.p. Under the direction of the Instituto Geografico Militare, maps on the scale 1 : 5000 and 1 : 2000 have been prepared, for which 117 positions were determined. Precise levelling operations have also been completed. The length of the proposed aqueduct is approximately 75 km. It is expected to be five years in building.

THE RECENT ACTIVITY OF KRAKATAO

After remaining quiescent for forty-four years since the catastrophe of 1883, a new period of activity set in on the site of the former peak of Krakatao, near the end of 1927, and continued with slight intermission through a good part of 1928. A short summary of the facts as deducible from the reports then available was given by Mr. B. G. Escher in the *Tijdschrift* of the Royal Netherlands Geographical Society for July of this year, at the close of an article in which he discussed in detail the mechanism of the outburst of 1883. The first definite indication of the new activity came from some Bantam fishermen, who saw clouds of steam and smoke on December 29, though discharges of gas seem to have taken place previously. The first observation by an European was that of Dr. Stehn, head of the Vulcanological Service of the Dutch Indies, from the ship *Wega* on January 3. The lesser explosions were then taking place at intervals of from half to one minute, the more violent being preceded by a pause of five to eight minutes. On a second visit, on January 10, the explosions were found to be more violent, and on January 13 the glowing masses discharged reached a height of 1200 metres. The discharges were preceded by a dome-shaped up-welling of the water to a height of 60 m. On January 26 part of a crater rim was seen above water, but it soon disappeared through the action of the waves and the increased activity. After an interval of quiescence in April the crater resumed its activity early in May, when flames were observed and an underwater discharge of red-hot lava. The writer locates the centre of the outburst at a spot corresponding to the sounding of 188 metres on the Dutch chart of 1919, on a line between Verlaten Island and the "Bootsmans Rots" (to the south-west of Lang Island), though the discharges are said to have taken place from six different vents. He thinks it unlikely that the cataclysm of 1883 should be repeated, but rather that a period of slow up-building of central islands may have set in. But the only certain way to guard against a repetition of the catastrophe of 1883 would be by shifting the dense population of the shores of Sunda Strait to an elevation of some 50 metres above the sea. The results of recent soundings are shown on charts accompanying the paper.

A JOURNEY TO TIBESTI

Between October 1926 and the following March, Commandant Rottier carried out a long reconnaissance in Tibesti. Setting out from Agades he led his party to the Tibesti mountains, whence, after a month's halt, they returned to Zinder

via Borkou and Lake Chad. M. Rottier contributes to the *Renseignments Coloniaux* (July 1928), published by the Comité de l'Afrique française, an account of the least-known part of his itinerary, that is the country between Belakoulbou, 63 km. north of Bilma, and Yebbi, in the Tibesti massif, some 1200 km. to the east, with particular attention to the geology and topography. From the outset this route lies across a series of steps from one sandstone plateau to another until the volcanic massif of Tibesti is reached, the altitude increasing from 300 m. to 2250 metres. In most cases these cliffs are breached by watercourses, so that travel, though difficult, is possible. The surface of the plains is also deeply cut up. At many points on the route evidence of the former wide extension of the soft sandstone beds, encountered farther to the east, is present: the Dada and Tademait mountains, the Defirou mountains, and the Logozonou mountains, proceeding from east to west, are remnants of this formation. At Dada its lower level is at about 350 metres above sea-level. The small number of the fossils yet found makes it difficult to determine its age, but taking into consideration Col. Tilho's results in Ennedi, M. Rottier believes it to be Silurian. Beyond Defirou the characteristic flat-topped, steep-sided mountains give place to "bastions" rising to rounded summits above the general level: similar topography is to be seen nearer Tibesti at approximately the same altitude, pointing to the existence of a superior terrace with a base-level between 500 and 550 metres. At the western foot of the Logozonou mountains, the route crossed a wide eliptical-shaped depression, about 50 metres below the general level, the result probably of æolian erosion. Other characteristic features of this region are the deep gorges of the *enneri*, for example, that of Zouar, the walls of which range from 50 to 300 metres. The numerous tributaries, also deeply entrenched, add to the difficulties of travel. Leaving the plateau the Zouar debouches into a wide basin which it has cut for itself in course of time, and which is one of the centres of population in Tibesti. To the east, again, lie the upper beds of the Silurian sandstones up to 1400 metres. Two hundred kilometres beyond Zouar rise the basaltic cliffs of the "Tarso," or high central plateau, with summits approaching 3000 metres. Except for one or two valleys few routes penetrate into the interior, and the surface becomes exceedingly broken. The highest point on the route was reached on the jagged rim of one of the ancient Tibesti craters, the Yey, the unresistant lavas of which have been strongly eroded. That these volcanoes were active only in a remote period is shown by the fact that some of the valley-beds are now more than 100 metres below the level of the lava-flows. Finally, in the centre of the mountains, at Tarso Yega, there are the vestiges, at 2200 metres, of ancient crystalline rocks. The volcanic soils are particularly fertile, and where water is available for irrigation, villages numbering up to fifty inhabitants are found. One of these possesses upwards of 8000 palm trees. M. Rottier estimates the total population of Tibesti at 9000. (Note: The French spelling of names is followed above.)

JOURNEYS IN NIGERIA AND THE SAHARA

At the beginning of 1927 Mr. T. A. Glover, accompanied by Mrs. Glover and, in the first instance, two Englishmen, set out from England for Central Africa on a mixed enterprise which was to include some zoological collecting, the investigation of certain special subjects such as commercial gums, and the making of cinematograph films of the animals, peoples, and places visited. Mr. Glover landed with his party at Lagos in Nigeria, and drove through to the Northern Provinces in his Crossley tender *via* Benin and certain routes not hitherto known to be practicable for motor cars. After some collecting in Northern Nigeria Mr. Glover and his wife, by the spring of 1927, and alone

save for a native servant or two, driving themselves reached the Lake Chad area and eventually Mao in Kanem, whence early this year they made for Tibesti. They reached the neighbourhood of Emi Koussi for the first time by motor car so far as is known. They were reported killed and did as a matter of fact only just escape disaster from a raiding party. Returning to French Central Africa they entered the Gaboon, having collected for the British Museum (Natural History Section) an elephant skeleton as they had been requested to do, four giant eland, a gorilla, and various small mammals from the latter country. In the summer of this year they were in the Ubangi-Shari country, intending to return to England early in 1929 *via* Wesso, Minkebe, and Spanish Guinea.

FISHING INDUSTRY OF SIERRA LEONE

The Government of Sierra Leone has recently published a Report on the fishery resources of the colony by Mr. James Hornell, late Director of Fisheries in Madras. The present position is that the marine fishery grounds are extremely rich, but that, through local customs and conflicting interests, they are virtually unexploited. Mr. Hornell's report is therefore largely devoted to recommendations for the economic organization of the industry. The two fishes caught are the bonga, a species of shad, and the snapper. The bonga is present on the coasts all the year round: is caught with cast-nets by a fleet of canoes over a thousand in number, and, when cured, forms the chief fish export to the Protectorate. The snappers, which will take a baited hook, are also plentiful, especially on the banks between Freetown and the Isles de Los, and the Sherbro shoals. Among the methods of fishing described are staked fish-traps in the estuaries, and walled tidal enclosures. The best quality of fish are got by lining for bottom fish from the Kru canoes. Deep-sea fishery, said to have been established by Nova Scotian settlers at the end of the eighteenth century, employs at present about thirty open boats, but the number of men engaged is declining, so that the market for good fish is being lost. If the industry is to be developed, the methods of catching, curing, and sanitary conditions generally must be improved, especially curing, for the demand for fresh fish is insufficient to absorb greatly increased supplies. Mr. Hornell recommends the "pilchardizing" of the bonga, after the fashion of the Cornish industry. This would incidentally give a valuable by-product in the oil obtained in pressing, and should the amount of fish caught by improved methods exceed the demand for food, a valuable fish-oil and fertilizer industry could be built up at little cost, as has been done in Madras. Apart from technical improvement, he shows how Government can secure a standard produce, assist in creating an extended market, and control the future of the industry. Local markets are present and can be extended: 830 tons of dried fish went by rail into Sierra Leone in 1927, while the annual import of all kinds of fish into Nigeria exceeds half a million pounds sterling.

INLAND NAVIGATION IN LOWER EGYPT

The condition of inland navigation in Lower Egypt is the subject of an article by M. Jean Lozach in the *Bulletin* of the Royal Geographical Society of Egypt (December 1927). After emphasizing the position of water transport as almost the sole means of traffic in the Delta for many centuries, he analyzes the causes of its present decay. The middle of the nineteenth century was perhaps the most flourishing period of water transport on the lower Nile, and many plans were evolved for its betterment. It was proposed, for example, to unite Alexandria, Cairo, and Suez by a canal through the Delta, and alternatively Alexandria and Suez by an international canal through the northern lakes. These schemes came to nothing, and the system of waterways suffered greatly

from railway competition, the construction of the Suez Canal, and above all, from the river regulation in connection with the various Nile irrigation schemes, which at certain seasons practically prohibits navigation in the Delta. To prevent its complete extinction, M. Lozach pleads for cooperation between the Ministries concerned, which would secure immediately a minimum depth of water in the channels and the regulation of bridges across them, and, later, more adequate locks, ports (at present little more than riverside quays), and vessels. Under present conditions he does not believe that such improvements would have any adverse effect upon the railways.

SOIL WASTAGE IN THE UNITED STATES

In the *Scientific Monthly* for August 1928, Mr. H. H. Bennett gives grave warning of the loss to the resources of the United States through soil wastage by erosion. This is mainly due to natural causes, but it is being actively assisted by the cultivation of steep slopes without precautions against erosion. In one county in the Southern Piedmont region, 90,000 acres of former good farm land have recently been classified as "gullied land having no further agricultural value" except for occasional strips, and has only moderate value for trees. Similar destruction is being wrought in the loess region on the eastern side of the Mississippi. In the south, agriculture has been largely driven out of the uplands, and tracts of rich alluvial soil buried beneath the outwash of less fertile soils, and the drainage systems choked, with swamps resulting. Forty years ago large-sized boats could ascend the Coldwater river to Coldwater for cotton: now the Coldwater is unnavigable, and a large cotton plantation abandoned, covered with sand beds from the overflowing river. Similar destruction is being wrought in the black belt of Central Texas. Nor are the Northern States immune. A land survey of a county in North-Eastern Kansas showed that an average of at least 6 inches of productive loams had been removed from the uplands. One valley was proved to have lost from 8 to 40 inches of soil over 86 per cent. of its uplands since they were cleared forty years ago. On this land apple orchards were failing to establish themselves. The agricultural lands along the Missouri have suffered similarly, from sheet erosion, *i.e.* the removal equally over a gently sloping area of the upper soils. The one instance observed here of an attempt to arrest this destruction was where a farmer had placed at the foot of converging slopes a line of straw stacks. Behind one of these 430 tons of soil accumulated during the autumn rains of 1927. Ploughing down the slope contributes in many cases to the formation of gullies. Results obtained at the Missouri Experimental Station show that, on an average of six years, 41 tons of soil were removed annually from an acre of land ploughed 4 inches deep, and that 68 per cent. of the rainfall was absorbed, whereas, on similar ground and slope, covered with blue grass only one-third of a ton of solid matter was removed, and 88 per cent. of the rainfall retained. To a greater or lesser degree this is occurring wherever in the United States the prairie covering has been removed for wheat production. The greater run-off from eroded lands also affects adversely the hydrological regime. The chief means of combating this evil is terrace-cultivation, but the details still require study. The South-Eastern States are progressing in this: in Texas, half a million acres were terraced in 1927. There the initiative comes largely from banks and chambers of commerce. On certain types of land excessive erosion results if agriculture is attempted under any conditions. Though there is evidence that the urgency of this problem is being realized by American farmers, much progress has yet to be made. The article is illustrated by a number of interesting phogographs.

SUBDIVISION OF THE NORTHERN TERRITORY OF AUSTRALIA

We are indebted to a Fellow of the Society, Mr. A. Grenfell Price, for a letter calling attention to certain errors in the article which appeared in the July *Journal* with the above title: it was said that the first white settlement in the north of Australia was at Port Darwin in 1824, and that South Australia was cut out of New South Wales in 1838. Mr. Price writes: "In actual fact the first white settlement in the north of Australia was founded at Fort Dundas, Melville Island, on Apsley Strait, between Melville and Bathurst islands in 1824, and for a variety of reasons this station lasted only until 1828, being succeeded by equally unsuccessful stations at Raffles Bay 1827–1829 and Port Essington 1838–1849. Miss Dora Howard has shown in a recent research paper in the London Bureau of Historical Research that these settlements were less due to the fear of foreign annexation than to the desire to combat Dutch trade which was spreading strongly through the East Indies, and to the hope of establishing commerce with the trepang fishers—the Bugis. Port Darwin was not occupied until it was selected by Surveyor-General Goyder in 1869 as the site of the South Australian settlement which followed the annexation of the Northern Territory to that colony in 1863. Further, South Australia was not cut off from New South Wales in 1838. An Act of the British Parliament, passed in August 1834, empowered the Crown to erect South Australia between the boundaries given in your article into a Province or Provinces, which was done by letters patent in February 1836, and the first Governor landed in the colony and proclaimed it in December 1836." The date 1838 was that of an Act amending the original Act of 1834.

THE GREENLAND ICE-SHEET

A useful summary of facts and theories about the inland ice is contained in a paper of Olaf Kayser in *Greenland* (vol. 1, 1928). It discusses the extent and slope of the ice-sheet, the mechanics of glacier motion and icebergs, and the physical structure of the ice, which like all glacier ice is granular, or only very exceptionally compact. About 86 per cent. of Greenland is covered with ice, and the inland ice reaches the sea in many places, forming the coast for considerable stretches. It is pointed out that in Greenland the climatic snow-line, by which is to be understood the altitude above which some of the precipitation on a horizontal surface remains in the form of snow from one year to another, is difficult to define; since it is a land where the obliqueness of the sun's rays renders topography of especial importance to melting, the actual or topographic snow limit is very irregular and much at variance with the theoretical. The latter is stated to lie between 2000 and 3000 feet in S. Greenland, decreasing northward in spite of diminished precipitation, and reaching sea-level locally in N.E. Greenland. But local conditions affect the snow-line greatly. Thus on Upernivik Island a plateau of over 2000 feet altitude has been found free from snow, whereas in another place year-old snow was found on sea-ice in August, and was shortly afterwards increased by fresh snow. It may be doubted, however, whether it is quite legitimate to compare the permanence of a snow-cover on sea-ice which need not be derived from snow, with that over bare land or land-ice which is always of snow origin. The Ross Barrier, for instance, is sometimes used as an argument by those who think that the snowfall of the Antarctic Continent would be sufficient to survive the heat of summer were that continent reduced to sea-level. But the argument loses force for the reason that the Barrier is partially afloat, is of limited extent, and lies in a very cold environment of high plateau on one side and sea-ice on the other.

The paper discusses the origin of the inland ice, its relation to the configura-

tion of Greenland and the nunataks, and the factors which govern the surface form of the ice-sheet. The profile of the ice-sheet has been found from observations taken on the several crossings of Greenland to be of marked mathematical regularity, and, indeed, the surface form is shown to agree well with a formula of Lord Kelvin for a plastic mass spread freely over a level underground, allowance being made for the fact that the surface of Greenland is not level. It is shown to be extremely probable that it is in the main the very properties of the ice which determine the broad features of its surface form, and not the underlying configuration. Although the climatological side of the question is not specifically taken up, the author thinks that this conclusion somewhat weakens the case of those who believe that the ice-sheet is absolutely dependent upon the altitude of Greenland. But here again we have to take the elevation of Greenland and its ice-sheet of about 4000 feet in thickness together as a single phenomenon, and there does not seem to be anything in the geographical environment of Greenland except height to differentiate it substantially in climate from other Arctic lands.

Finally, although local advance and retreat of the ice margin have taken place there does not appear, from the older accounts available, to have been any change in the thickness and extent of the ice-sheet within historic times. This does not at first sight tally with Brook's minor climatic "optimum" some two thousand years ago (*Journal*, 70, 168). But though a warmer Greenland might remove local snowfields near the coast the rise of temperature would most likely increase the snowfall on the high inland ice-sheet, and thus in the end keep the ice-sheet as extensive as before. In fact, over any region which is cold enough to transform its annual snowfall into ice instead of water, the secondary reactions of the ice upon the climate become so powerful that it is difficult, within certain critical limits, to say what effect upon the intensity of glaciation a rise or fall of temperature might have.

PLUTONIC WATERS

In a paper on the "Origin and Distribution of Underground Waters" addressed to the British Waterworks Association and published in the official circular of that body (No. 69, 1927), Prof. J. W. Gregory deals a severe blow to the old notion that all land water without exception comes from rain. It is true that of late years this notion, once so obstinately entertained, has been relaxed in face of the cumulative evidence afforded by the temperature and chemical composition of waters met with in tunnelling and mining, and of hot springs, that such water could not be of surface origin. What Prof. Gregory stresses is the important part which plutonic water plays in the economy of the Earth's surface. He considers that a great deal of the water of hot springs, also of geysers and of that which is ejected in volcanic eruptions, is of plutonic origin. He adds that there is clear evidence that such water, acting under high gas pressure beneath the great artesian basin of East Central Australia, is a powerful agent in forcing to the surface through the bores connate and meteoric water contained in that basin. Prof. Gregory thus recognizes three kinds of underground water: meteoric (that derived from the atmosphere), connate (that which has been stored in sedimentary rocks since their deposition), and plutonic (that thrown off from igneous rocks in course of their solidification). He estimates that the igneous rocks before solidification contained 4 per cent. of water, whereas they now contain only 1·15 per cent., and that this loss of water would suffice to account for an ocean 2 miles deep, which is the actual average depth of the sea. Thus the sea at any rate in part is of "plutonic" origin, and it is suggested that the supply of plutonic water from hot springs has been steadily,

through the ages, increasing the volume of the ocean. Unless, therefore, there is a counterbalancing leakage of water through the crust which passes out of the surface circulation through the atmosphere, the amount of water on the Earth's surface must be slowly gaining.

BLAEU'S MEASUREMENT OF AN ARC OF MERIDIAN

A correspondent in South Africa recalls the fact, sometimes overlooked, that in addition to the well-known measurement of a degree of latitude in the early seventeenth century by Willebrord Snellius (by the method of triangulation) an independent measurement was carried out about the same time by the great map and globe maker Willem Jansz. Blaeu. Unfortunately, for some unexplained reason, the results were never published, which accounts for the small attention given to the operation by writers on the history of geodesy. All that is known of Blaeu's undertaking is derived from one or two contemporary, or nearly contemporary, references, which are recorded in Baudet's "Leven en Werken van Willem Jansz. Blaeu" (Utrecht, 1871), among other works. As this is written in Dutch, it may be worth while putting on record once more what is known on the subject. The first mention of the operation appears to be that of Vossius (friend of Joan Blaeu, son of Willem Jansz.), who says that the son intended to publish what his father had written about it—an intention never carried out, however. The distance from the mouth of the Maas to Texel is said to have been measured along the coast, and the latitude of the two ends determined with an instrument whose radius was 14 Rhenish feet. (Illustrations of the very large quadrants, sextants, etc., used in Tycho Brahe's observatory, where Blaeu himself had been a student, are given in vol. 1 of Joan Blaeu's great Atlas, and a quadrant of 7 feet radius, made by Willem Blaeu, is preserved at Leiden). Baudet thinks that the measurement must have been made *before* that of Snellius (1615) the results of which were widely known through their publication in 1617. Reference to the operation is also to be found in Picart's 'Voyage d'Uranibourg,' where the latter's meeting with Blaeu the younger in 1671 is described. Strangely enough Picart attributes the measurement to this younger Blaeu, and says that he saw the unpublished MS. describing the observations, and found to his satisfaction that Blaeu's figure for the length of a degree differed from his own by only 60 Rhenish feet. If this were true Blaeu's result would be nearer the fact than that of Snellius. It is to be feared that there is little chance of the MS. referred to being ever discovered, a careful search for it more than a century ago by Beeck-Calkoen having proved fruitless. We may suppose it to have been destroyed in the disastrous fire at the Blaeu establishment in 1672. Baudet suggests as a reason for its non-publication distrust of the accuracy of the figure obtained, caused by its divergence from Snellius's.

CHRISTOPHER SAXTON

Much of the uncertainty surrounding the life of Christopher Saxton, the sixteenth-century cartographer, has been dispelled by Sir George Fordham's recent researches, the results of which, under the title of 'Christopher Saxton of Dunningley: his life and work,' have been reprinted from the Thoresby Society's *Miscellanea*, volume 28. The phrase "of Dunningley," for which the authority is Saxton's depositions when applying for a coat-of-arms, serves to dissociate him altogether from the other Christopher Saxtons with whom he has been confused. From these same depositions, he seems to have been born in 1542 or 1544, "or thereabouts." The various gifts he received from the Crown are also recorded. Before his first maps had appeared, in 1574, he had received at a rental for twenty-one years the Manor of Grigston, Suffolk; and in 1575 he obtained the further grant of the reversion to the office of Crown bailiff for

London and Middlesex of the lands formerly belonging to the Priory of St. John of Jerusalem. These were in remuneration for his work, as the expenses of his survey were borne by his patron, Thomas Seckford. Among later favours he was granted, in 1577, the exclusive rights for ten years of publication of his "trewe and pleasunte mappes." Sir George Fordham then relates his discovery of the evidence for the existence of a large map of England and Wales by Saxton, and of the derivation from it of the "Quarter-Master's Map" engraved by Hollar in 1644, which has been recorded in detail in the *Journal* (67, p. 63; 70, p. 50; 71, p. 50). He also traces clearly the use made of Saxton's maps by others, amongst them Speed, Peter Keer, and P. Lea. The last piece of Saxton's work which Sir George has been able to trace is a plan put in by him in a case of disputed water rights, dated "Brunley," 1606. The appendix contains a short bibliography, a Saxton pedigree as far as it can be made out, and transcripts of relevant documents.

GERMAN COLONIAL PERIODICAL

In recent years the *Mitteilungen aus den Deutschen Schutzgebieten* has continued to appear, with articles based largely upon materials collected before the war. Thus Volume Thirty-five consists of a paper by Dr. W. Behrmann on the central mountain range of New Guinea from observations on the Sepik Expedition of 1912–13. The special feature is the series of eighteen panorama sketches of the mountains by the author, from which he endeavours to reduce to order the tangled topography of the central series of parallel ranges with their offshoots. He has also some observations of the volcanic islet Manam to record. In the first part of Volume Thirty-five there are four articles of varied scope. Leut. F. Köhl and Père P. Schumacher describe visits paid in 1912 to the new volcanic outburst, Ntsuro (Katerusi), south-west of the volcanoes Niragongo and Namlagira of the Virunga group, and Père Schumacher relates a recent visit in 1927, when he also climbed to the crater of Namlagira on three successive days. The Ntsuro volcano is simply the result of the fissuring of the crust and the resulting outflow of lava, there being no neck or cinder cone visible. In another article Dr. G. Friederici, discussing the problem of pre-Columbian external influences upon American culture, gives his reasons for asserting the influence of the Malayo-Polynesians. When he sets out at length the main basis of his argument, the seaworthiness of their boats, particularly the double-outriggers, the seamanship of the Pacific islanders, and the general practicability of the long voyages required, he is on relatively firm ground, though he rates the islanders higher in the nautical scale than the Northmen; but his discussion of traces of their culture in America leads him into more controversial regions. Herr E. Gudowius examines the navigability of the Kagera river from experiences gained in 1908, and shows how it might have been used in conjunction with the projected Ruanda railway. The article is accompanied by a revised issue of the relevant sheet of Sprigade and Moisel's map of East Africa. All the papers are illustrated.

GILCHRIST STUDENTSHIP

The Gilchrist Trustees again offer, for 1929–1930, a Geography Studentship of £80 for the furtherance of improved teaching of Geography in schools, tenable at any recognized School of Geography. Applicants, who should be teachers with at least two years' experience, should send in their names to Prof. L. W. Lyde, Yew Grove, Sandhurst, Berks, from whom further particulars may be obtained, before 2 February 1929. They must give references and a full account of their previous work, and their applications should be accompanied by three testimonials.

BIBLIOGRAPHIE GÉOGRAPHIQUE 1927

The thirty-seventh issue of the Bibliographie Geographique will be published by the *Association de Géographes français* in the next few weeks. This volume will include particulars of all important geographical works and articles in scientific serials which appeared during 1927. Brief notes indicate the scope and value of most of the entries. This Society contributes bibliographical material for the British Isles and the Dominions; other bodies contributing to the 1926 volume were the American Geographical Society, the Italian National Committee for Geography, and the Royal Egyptian Geographical Society. The forthcoming volume will contain over 600 pages, with 2000 entries, many of which comprise several titles, and an author-index of 5700 names. This is an appreciable increase upon the last volume, and enhances the value of this important aid to students of geography, which is approved by the International Geographical Union. By arrangement with the *Association de Géographes français*, the Society distributes the bibliography in the British Isles and the Dominions at a special price: orders should therefore be sent to the Chief Clerk at the Society's House, Kensington Gore, S.W.7. The charge will be 8*s*. 6*d*. including postage. Each of the volumes for the years 1924, 1925 and 1926 can also be obtained at the same price.

CORRESPONDENCE

THE FIRST ASCENT OF PRE-GHAL

With reference to my paper on Pre-Ghal which appeared in the October number of the *Geographical Journal:* I have since, by the kindness of his son Captain C. J. Grant, had the privilege of reading the diary of the late Colonel C. Grant, 1st East Surrey Regt., from which it is quite clear that a party of three British Officers, with a number of rank and file of the Indian Army and some local tribesmen acting as guides, reached the summit of Pre-Ghal on 8 May, 1881. It appears therefore that the Mahsuds who stated that no Europeans had ever previously ascended beyond the Bospa Plateau were indulging in a little pleasant flattery.

W. R. HAY.

MEETINGS: SESSION 1928–1929

First Evening Meeting, 5 November 1928. The President in the Chair

Paper: Caravan routes of Inner Asia (Third *Asia* lecture). By Mr. Owen Lattimore

First Afternoon Meeting, 12 November 1928. Admiral Sir William Goodenough, K.C.B., Vice-President, in the Chair

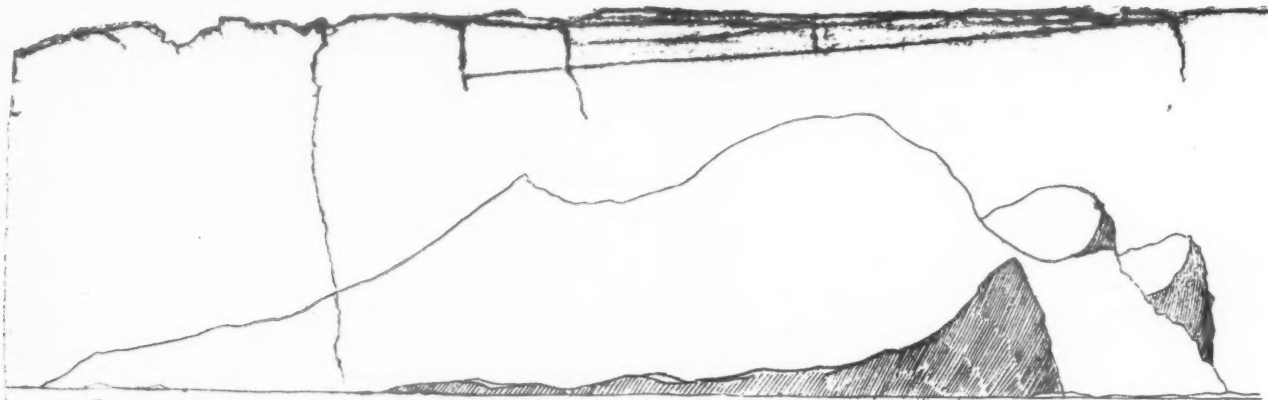
Paper: Lettering on Maps. By Captain J. G. Withycombe

Second Evening Meeting, 19 November 1928. The President in the Chair

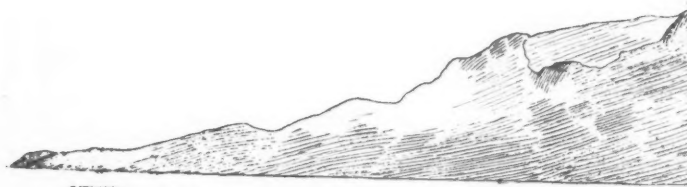
Elections: Nessib Abcarius Bey, PH.M., LL.B.; Miss Georgina F. Aldridge; Robert Claude Ashby; Robert Ashton; Lieut. Andrew Walter Barlow, R.N.V.R.; Thomas Edward Beck; Mrs. Charles Bentinck; Lieut. John Borradaile; Frank C. Bowen; Leonard Edwin Boxall; Rear-Adm. Sir Douglas Brownrigg, BT., C.B.; David Suleiman Bulos, M.D.; Henry Butt, J.P.; Walter Duncan Charlton; Kali Prosanna Chatterjee; Charles Neville Clarke, M.A.; Stanley William Clarkson;

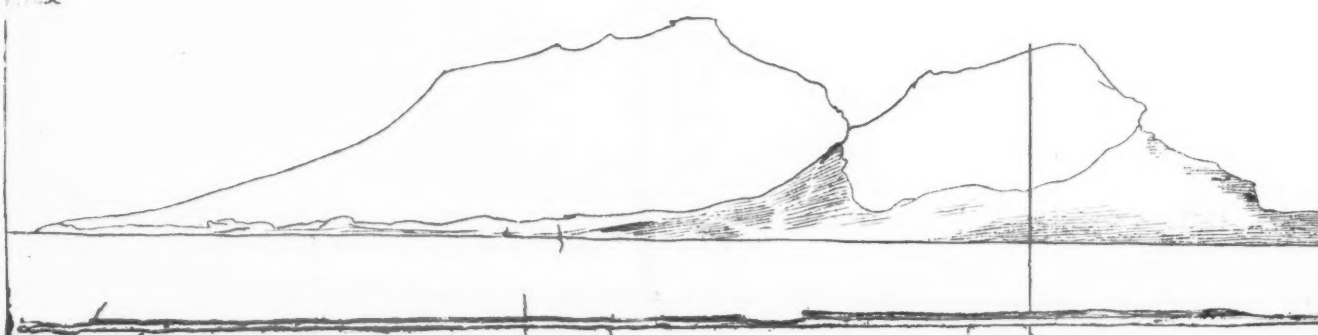
J. St. H. Cleburne; Albert Wilfrid Clements; Mrs. Oliver Coales; The Rev. Walter H. Colbeck; Hugh Conn; The Rev. James Joseph Cooksey; Augustin Courtauld; Dr. William Day Crockett; John Francis Crosher; Charles de Bunsen; F/O. William James Duncan, R.A.A.F.; John Grove Dunning; Wilfrid Stanley Edwards; the Rev. Robert B. Ekvall, B.A.; Norman Leslie Falcon; Capt. H. J. Feakes, R.A.N.; Arthur H. Fisher; George Stanley Fletcher, B.SC.; Mrs. Jessie Foote; Lt.-Col. William Washbrough Foster, D.S.O.; Harold Freese-Pennefather; Lieut. Eric E. French, R.A.; Lady Jane Gathorne-Hardy; Prof. J. N. Ghose, M.SC., B.T.; The Rev. Peter Gorodishz; The Rev. J. A. Graham, D.D., C.I.E.; Adolph G. E. Hanke; Seng Ong Ho, B.A.; Keyworth E. Houston; David R. Hudson, B.COM.; The Rev. Edward William Hughes, B.A.; Francis Humphreys; Arthur Leigh Hunt, J.P.; Major Raymond P. G. Ireland, M.C.; David Alexander Irvine; Mrs. E. Nevill Jackson; Floris Jansen; Arthur Johnson; Lewis Kershaw; Guy Nelson King; Prof. Hans K. E. Krueger, PH.D.; Owen Lattimore; C. Lloyd; Major Reginald Loder; Graham Lyon; Capt. Albert H. MacCarthy; Major David Livingstone McKeand; Miss Margaret Isabelle Massey; Mrs. Mary Judith Massey; Beresford V. Melville, O.B.E., J.P.; Arthur Miller; Ernest Mitchell; Lt.-Commr. James Robert C. Montgomery, R.N.; Sidney Mortimer; Lionel Leasowe Mortlock; Herbert Rind Mothersole; G. R. Nath, B.A.; Benjamin John James Maxwell Nimmo; Robert Ferrier Noel-Paton, B.SC.; John Francis Clare O'Brien; The Right Hon. the Viscount Ockham; Capt. Robert J. Paul; Mrs. Andrew Pearson; Miss Eleanor Peplow, LL.A.; Prof. Sidman P. Poole, M.S.; Miss Margaret Powell, B.SC.; T. S. Powell; Johannes Marius Prillevitz, O.B.E.; Capt. C. C. Prior, I.A.; Capt. Richard Ogilvy Ramage; Harry Frank Reddick, B.SC.; Franklin Remington; Edmund William Richardson; Robert Ernest Thomas Ridout; Miss Jane Roberts; Edwin Robinson; Peter Murray Rennell Rodd; Lieut. Percy Roe, A.E.C.; Miss Clara C. Rogers; Prof. Wilbur George Roslington; Foster St. Barbe; The Rev. John William McArthur Sayers; Miss Dora Jeanne Schofield; The Rev. Ernest F. P. Scholes; Percival Samuel Schor; Major T. V. Scudamore, V.D.; Arnold Guy Sherwell; Miss Ethel Simkins, M.A.; S. Narain Singh, B.A.; Cato Petronella Smuts; The Very Rev. Dean Frederick Salmon Vaughan; Capt. William Edward Steel; Lieut. George M. S. Stitt, R.N.; Richard Lightburn Sutton, jnr., B.SC., A.M.; The Rev. John Edward Swinhoe; Prof. Taoru Tanaka; Commr. Arthur Grendon Tippet, D.S.O., R.N.; Ryder Vaughan Tivy; Alfred Markham Townsend; K. D. Vacha; Major Barnardino G. Vallenas; John Vincent; Cyril Ward; Patrick Francis Sutherland Warren; I. H. L. Waterhouse, F.R.A.I.; Capt. Harold Burges Watson; Alexander Thomas Williams; H. E. Williams; Miss Margaret Swainson Willis; Lt.-Col. Walter Carandini Wilson, D.S.O., O.B.E., M.C.; Richard William Digby Wingfield; Walter A. Wood; Henry Bedford Wrigley; Hector Young.

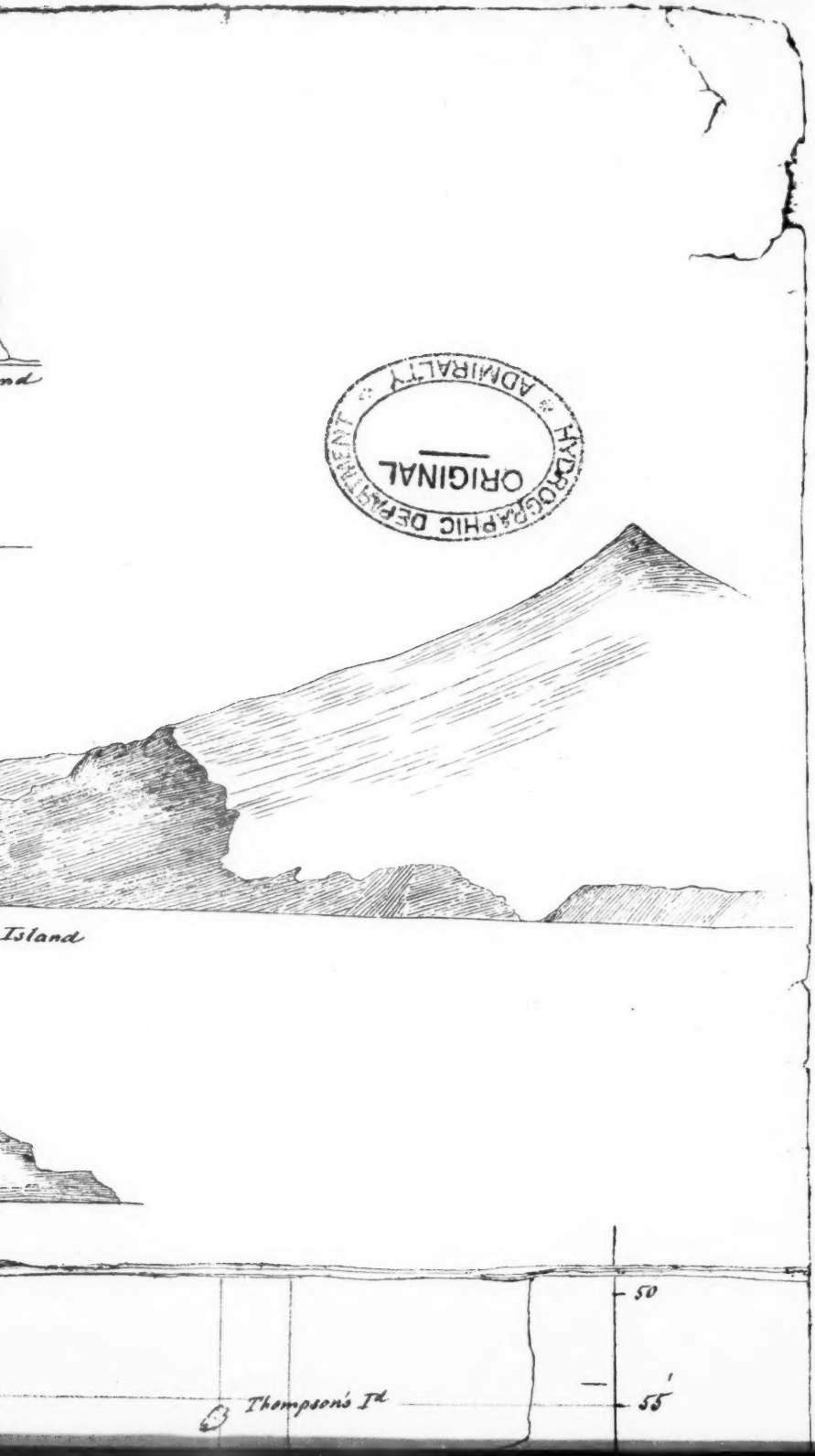
Paper: Recent work on the Problem of Lake Moeris. By Miss G. Caton-Thompson and Miss E. W. Gardner.



Thompson's Island



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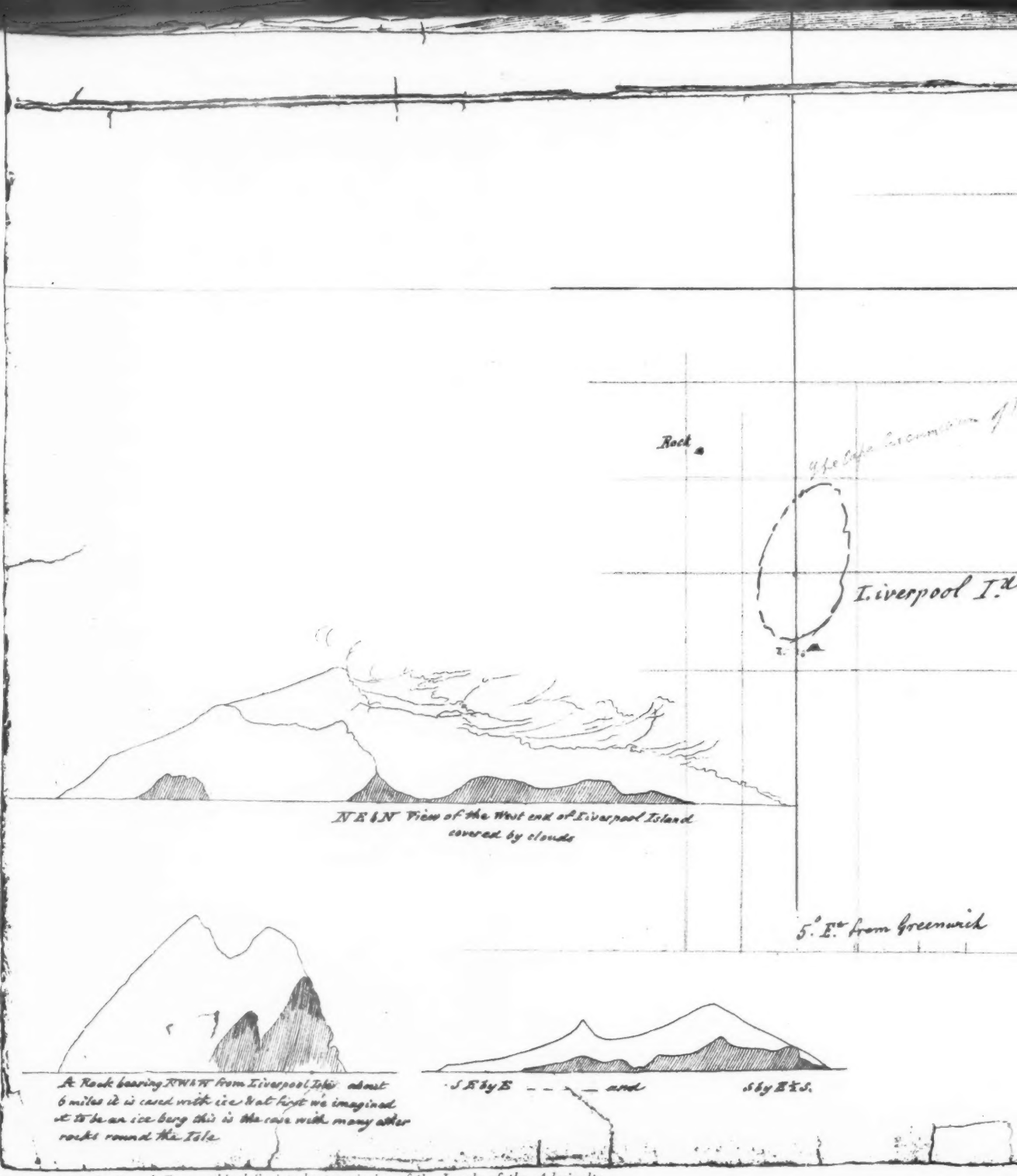
Rock
Liverpool I.d
5.° E.ly from Greenwich
NE & N View of the West end of Liverpool Island covered by clouds
A Rock bearing NW & W from Liverpool Isle about 6 miles it is cased with ice Nat. first we imagined it to be an ice berg this is the case with many other rocks round the Isle
S E by E
and
S by E ½ S.

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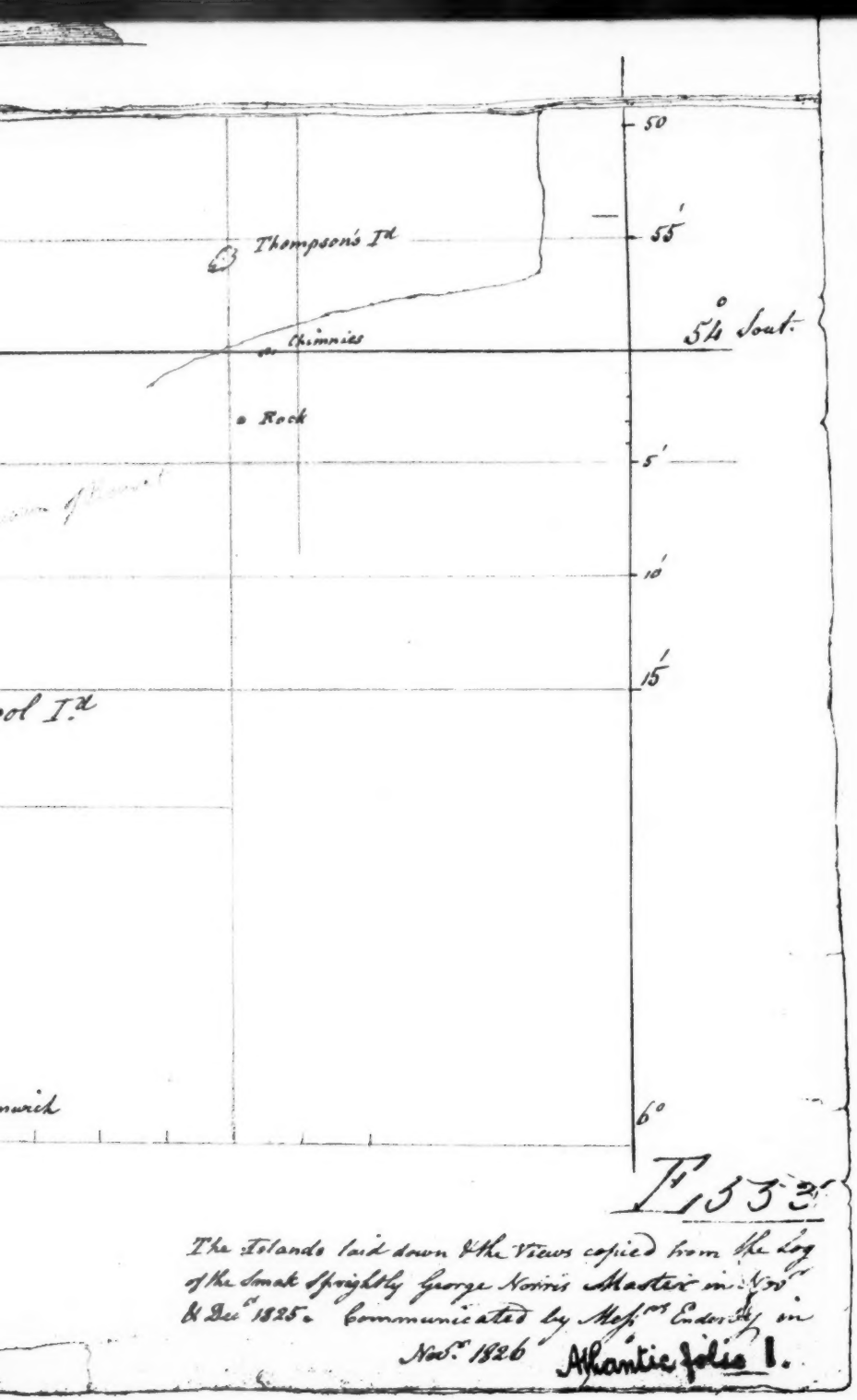

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BOUVET ISLAND

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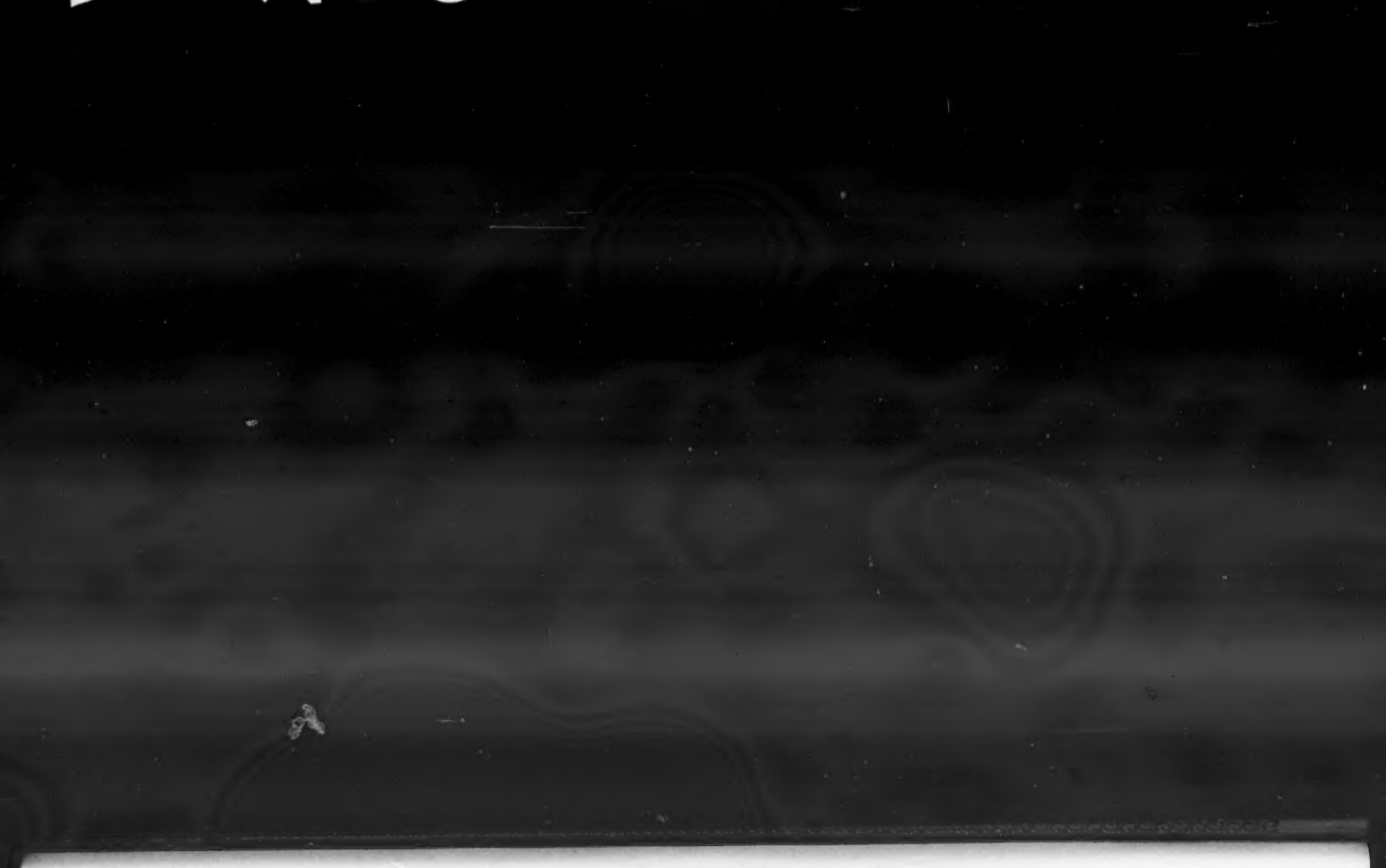

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FROM THE PREFACE

'To study the broad lines of history without the correction afforded by its application to the scenes in which we live, is apt to dull our senses to the true lessons of history. In the Persian Gulf, as elsewhere, it is in our power, as it is our duty, to learn from and to profit by the mistakes of past generations. If we do so, we may look forward with confidence to the future.

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all events for the present, here to bring to a conclusion this somewhat lengthy summary of the history of this region. Aristotle says that a drama ends, but an epic poem only leaves off. It is to be feared that the reader may gain, from the conclusion of this work, the impression that the stream of British influence instead of gaining in strength has lost its strength in later years. But, to quote Wordsworth:

> It is not to be thought of that the Flood
> Of British freedom, which, to the open sea
> Of the world's praise, from dark antiquity
> Hath flowed, 'with pomp of waters unwithstood',
> Roused though it be full often to a mood
> Which spurns the check of salutary bands,
> That this most famous Stream in bogs and sands
> Should perish; and to evil and to good
> Be lost for ever—

We have maintained order and thereby promoted trade; we have raised the standard of living and thereby encouraged the spread of education: we have thus fostered the growth of individual freedom and of aspiration to succeed in life. This is what we understand as civilization, and what we call progress lies in the changes of structure in the social organism which entail such consequences:[1] a belief in the existence and possibility of progress is our secular creed, and to promote it all over the world is our secular mission.

It was a favourite maxim of Sir J. R. Seeley that history, while it should be scientific in its method, should pursue a practical object. That is, it should not merely gratify the reader's curiosity about the past, but modify his view of the present and his forecast of the future. Now, if this maxim be sound, the history of the growth of British influence in the Persian Gulf ought to end with something that might be called a moral. Some large conclusion ought to arise out of it: it ought to exhibit the general trend of affairs in such a way as to set us thinking about the future, and divining the destiny reserved for the peoples concerned. Of the European nations who have played a prominent part in Persian Gulf politics, England alone has throughout the centuries maintained and improved her position. Some countries which once played a prominent part in these waters, such as Portugal and Holland, have, in a manner, turned their back on their past history, and are developing on different lines.

[1] See *The Idea of Progress*, J. B. Bury.

[*Specimen page*]

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